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ABSTRACT

This proceedings contains summaries of 24 conference papers focusing on new directions in gifted education. Each paper's summary is about four pages in length. Papers have the following titles and authors: "Supporting Giftedness in Girls in the Classroom" (Julia Ellis); "A Community of Learners in ECS" (Anne Green); "Inventive Momentum: Toward a Mature Artist" (Robert Kelly); "Personalized Educational Programming for the Gifted/Talented Learner" (Jo-Anne Koch); "Social Style/Learning Modes: Relation to Giftedness" (Jim Lavers); "The International Mathematics Tournament of the Towns" (Andy Liu); "Operation Minerva Rocky View: Mentoring Young Girls in Science" (Jean Makosz and others); "A Developmental Approach to Facilitating Knowledge Generalization" (Anne McKeough); "High School and the Advanced Placement Program" (Adell Nyberg); "Helping the Scientifically Gifted" (Michael C. Pyryt); "Encouragement as a Motivator" (Beverley A. Sohnle); "A Paradigm Shift from Giftedness-As-Potential to Giftedness-As-Possibility" (Elizabeth Sparks); "STRETCH: Nurturing the Potential of the Gifted in the Regular Classroom" (Sheila Spence and Jean Mudd); "The Case for Ability Grouping of Gifted Students" (Carolyn Yewchuk); "Implications of Alberta Education Policies and Practices for Gifted Students" (Lorraine Wilgosh); "Implications of Inclusive Education for Gifted and Talented Children: A Parent's Perspective" (Donna Rankin); "Inclusive Education: Teachers' Perspectives" (Tracey Schaufele and Susan MacDonald); and "Inclusive Education--Good for All???" (Debra Chinchilla). (Some papers contain references.) (JDD)

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CONFERENCE PROCEEDINGS

4th Annual SAGE Conference
September 24-25, 1993
Westin Hotel
Edmonton, Alberta

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NURTURING POTENTIAL
1993

CONFERENCE PROCEEDINGS

4th Annual SAGE Conference
The Society for the Advancement of Gifted Education

Conference Proceedings produced by
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NURTURING POTENTIAL

4th Annual SAGE Conference

The Society for the Advancement of Gifted Education (SAGE) is an umbrella organization consisting of the primary stakeholders in gifted education in Alberta: the Centre for Gifted Education (CGE) at The University of Calgary, the Gifted and Talented Education Council (GTEC) of the Alberta Teachers' Association, the Educational Response Centre (ERC) of Alberta Education, and the Alberta Associations for Bright Children (AABC).

The 4th Annual SAGE Conference with a theme of *Nurturing Potential* was held in Edmonton, September 24-25, 1993.

The major focus of the Conference was on new directions in gifted education. Keynote speaker Margaret Lipp focused on the advances made in gifted education, the context of the field today and future directions in the next decade, while Robert Sylwester spoke about the educational implications of recent genetic and brain theory research and new developments in science and technology. All presenters were requested to provide brief summaries of their presentations for the Conference Proceedings.

We are pleased to provide this document, which represents summaries of 24 conference sessions. For those participating in the 4th Annual SAGE Conference, we hope these Proceedings capture the spirit of the conference. It should be noted that a detailed paper of one of the keynote sessions appears in the Fall 1993 AGATE (Journal of the Gifted and Talented Educational Council of the Alberta Teachers' Association).

We would like to acknowledge the assistance of the University of Alberta Conference Fund and the Centre for Gifted Education at The University of Calgary in the preparation of this document. We hope you find these Proceedings informative.

Carolyn Yewchuk
June Mielnichuk
Conference Co-Directors

CONFERENCE PROCEEDINGS
1993
4th Annual SAGE Conference
'Nurturing Potential'

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Supporting Giftedness in Girls in the Classroom

Julia Ellis
University of Alberta

Overview: The classroom is a place where girls can learn to doubt their own ability, creativity, and importance. The session begins with a presentation of research findings (my own and others') which illustrate the dynamics and manifestations of this trend. Time is provided for small group conversations about these dilemmas in our own work sites. The final part of the session offers instructional strategies which can contribute to the alleviation of some of the difficulties girls can experience in the classroom.

In a Toronto school, a teacher asked 14 and 15-year-old girls in a gifted program to answer the question: "How would being gifted boys be different from being gifted girls?" The girls had been in gifted programs for a number of years. They provided the following answers:

Boys overestimate themselves. Girls underestimate themselves. Boys brag more. The boys normally want more attention in class. Some of the boys feel they have to rebel. It seems as though it's something special when guys make it into the gifted program but it isn't for girls. It is more expected of boys to be gifted than it is of girls. The female teachers especially favour the boys.

I'd like to provide an examination of the classroom dynamics which can lead to the state of affairs described by these 14 and 15-year-old girls. The story of course begins before children even start attending school. When they first arrive they have already learned a lot about how to be a girl and how to be a boy. An important aspect of this for girls is learning verbal and physical self-restraint. Thus children come to school with girls already more compliant while boys can be more difficult to control. Given this situation it makes sense that teachers may center topics and activities around boys' interests and may have to attend more to the boys. Given this situation girls learn to wait for attention, to

become even more passive, and to learn to accept encroachment onto their access to resources.

Teachers' perceptions of boys and girls are very important. Children's understandings of themselves get constructed through significant adults' understandings of them. In our society "intelligence" is associated with the personality characteristics of independence, self-confidence, and adventuresome interests. Boys are more free than girls to publicly manifest these characteristics. In our society women also learn to be protective of the male ego. Thus when boys turn in sloppy, incorrect, or incomplete work, teachers tend to express support, confidence and encouragement and to offer more attention. Meanwhile, when compliant and able girls turn in tidy, correct, and complete work, the effort required for this can go unacknowledged and their good work can come to be taken for granted. Thus even when girls are doing well, nobody tells them and so they don't learn to believe that they are. Further, the modest, social, or domestic interests expressed in girls' work can be seen as less creative than boys' action/adventure oriented interests. Through all of this boys can learn to trust their own judgement while girls can learn to doubt theirs.

Throughout school girls can learn to present themselves as modest, self-deprecating, passive and obedient while boys learn that the space for their self-assertion and self-promotion is more generally and safely available. The pressure on girls comes from both the boys and adults. Thus girls can learn to not reveal the multidimensionality of their personalities, fail to learn how to hold the floor, and refrain from offering their "bright ideas" about how to do things better for fear of being seen as "interfering busybodies". Since they're hiding who they are and what they know, they can't receive praise for these things and develop

confidence and public skills. Girls can learn that the safest ways to get positive attention are through modest, self-deprecating, helpful activities. The social codes for male and female behavior are very strong and most children learn them well. The resulting classroom behaviors can serve to reinforce teachers' more positive expectations for the boys.

The net effect of a few years in the classroom is that girls can learn to doubt their ability, creativity, and importance. Even academically capable girls can fail to perceive their academic strengths accurately or experience satisfaction from their successes -- instead they focus on what they perceive to be their shortcomings. No one has enabled them to believe that they're really good at something and that this is really important. Only the criticisms have been heard.

One of the most important things too many girls learn in the classroom is that silence is a safe place. What they fail to learn are the personal practical skills of speaking on behalf of themselves, their ideas, or their concerns in the public space of the classroom.

There are many things we can do to support the development of girls' gifts in the classroom. Each classroom has different opportunities and constraints for this. Each teacher has his/her own creativity to bring to bear with these issues. I offer just a few strategies that may be helpful with this.

1. Offer assignments which invite more self-expressivity on the part of the children, that is, an opportunity for the child to combine a personal interest with the curriculum in their work. For example, after studying the "forest" in 2/3, invite children to design a forest home for their favourite Halloween character. Assignments which have some open-endedness and allow space for children's expression of their own knowledge, experience, talents, and interests help us to see more of each child's

uniqueness through their work. If all children's work is pretty similar due to the structure of the task, it is more difficult to notice and comment on each child's specialness.

2. Research students' related interests before beginning a unit on a particular topic. For example, before beginning a unit on the prime minister and federal government, a teacher asked her students to write a story beginning with "If I were Prime Minister . . .". She studied the stories and noted which social issues were written about by boys only, girls only, and by both girls and boys. This enabled her to plan unit activities with the interests of both girls and boys in mind.

3. When students express mythologies about gender, for example that all boys are better athletes than all girls, challenge these myths with their own realities. Talk about how children's abilities and interests/activities don't have to be restricted to appropriately gender-coded ones. Tell them that they can keep all parts of themselves as people: their interests, their compassion, and their ambition.

4. Facilitate class dialogue about girls and boys being able to be friends without either romantic or sexual overtones. This is highly appropriate when they start talking about so-and-so "loving" so-and-so while the children referred to respond by insisting that they hate each other.

5. Having students work in mixed-sex groups also e ables them to relate to each other as people with a variety of gifts and skills. Don't tolerate boys saying that "girls are yicky" any more than you would tolerate a child throwing a banana peel on the floor.

Note: This outline of the presentation is based on a lengthier paper entitled, "'If I were a boy . . .': Constructing knowledge about gender issues in preservice education" which will be published in *Curriculum Inquiry*.

A Community of Learners in ECS

Anne Green
Mossleigh Demonstration School

Can we meet the needs of our gifted children in the regular ECS classroom?
I BELIEVE WE CAN.

* Bob Samples, in his book OPENMIND WHOLEMIND (Parenting and teaching tomorrow's children today), shares that "teaching is celebrating a student's already-rich resources and seeking new domains of wisdom."

ACE

I leaned over the fence to speak with Ace, a mature, serious, little blond boy with big brown eyes. He was busy in his driveway beside his city home collecting rocks. We smiled at each other and I couldn't resist asking him if he was starting school.

He said, "I don't really want to go to school."
He was lining his rocks up on a long flat board. He continued, "but the only thing I want to go to school is to find out where rocks come from. I'm not sure if they grow or if they...." he attentively placed a tiny rock by a larger one. "I am pretty sure that they grow. They must grow, cause where else can they come from?"

Ace is already forming his hypothesis about his world and our responsibility as educators must be to foster the thinking that will bring about "seeking new domains of wisdom.".

He will enter his classroom on that first day in September with his pockets bulging and a great story about the origin of his rocks. A Community of Learners wouldn't be complete without a rock hound. I believe that as they bring their world to the classroom they continue to build onto their 'knowing'. Given the opportunity children tend to develop basic frameworks for their learning as naturally as walking. Eleanor Duckworth talks about Piaget's extensive studies concerning a child's practical use of what he or she already knows, in her book *"The Having of Wonderful Ideas."* We as teachers can best understand and support children coming to know themselves and others, in an learning environment that supports a Community of Learners. An environment that welcomes talk and wondering.

I have been sharing learning with first graders for ten years, in a nurturing environment created by children, parents, community members and myself. This past year I had the opportunity to share learning with an ECS class. Even though this was a small class of ten children and I was accustomed to 25 to 30 first graders, we began to create our environment. Someone said that the greatest performances elude the pen, however, I shall try to bring alive a student led Community of Learners .

An environment conducive for a COMMUNITY OF LEARNERS to actively EXPLORE ideas and experiences, CONSTRUCT meaning and COMMUNICATE understanding in cooperation.

An environment where learning is enriched and meaningful for gifted children in the regular classroom, as "they show parents and teachers the way."

ECS students experiment with written (drawing, scribble writing) and oral communication to build onto their ideas, predictions, hypothesizes, passions and interests concerning their *home world and their school world.*

to continue their natural curiosity, and love for learning.

This is what child-centered learning is about:

to respect the ideas and suggestions of others, avoiding stepping on someone's words

to build onto their own as well as the ideas of others as they come to understand the importance of their "voice".

to make decisions about their learning by explaining, questioning, and hitch-hiking from one another. (They know what it is that they still do not understand.)

to extend learning beyond the walls of the school, as we put into practice the philosophy, "EVERYONE A TEACHER, EVERYONE A LEARNER."

to respect one another's space.

to realize the "power" of mistakes. Stephen Nachmanovitch talks about the power of mistakes in his book entitled, *Free Play*. He writes

> " The troublesome parts of our work, the parts that are most baffling and frustrating, are in fact the growing edges edges. We see these opportunities the instant we drop our preconceptions and our self-importance."

to trust themselves as learners as they use their special strengths and talents to make their learning personal.

Theory and practice go hand in hand as we learn to be facilitators in our classrooms. *"Their Own Way"*, by Thomas Armstrong and *"Frames of Mind; The Theory of Multiple Intelligences"* by Howard Gardner guided me as I observed the unique strengths of the children. They unconsciously disclose talents and strengths while working independently or collaboratively in their Community of Learners. See the following notes:

Linguistic Intelligence--- Tanya likes to write, spin tales, excellent memory

Mathematical /Logical Intelligence--Jack computes problems, enjoys games of strategy, reasons things out logically,

Spacial Intelligence-- Bea enjoys art activities, visual, images when storying

Intrapersonal Intelligence-- Tom displays a sense of independence, strong will, reacts with definite opinions during discussions, enjoys private inner world, loves to pursue some personal interest or hobby eg. motivated to do well on independent study projects

Musical Intelligence-- Tanya remembers melodies of songs, tells you when a musical note is off key, needs music while working,

Bodily-Kinesthetic Intelligence-- Tom needs to touch other people when talking to them, demonstrates skill in a craft.

Interpersonal Intelligence-- Katty has a lot of friends, enjoys group things

The following are two of the many stories, shared by the students within Community of Learners. They are transcribed from the student's actual talk. Interestingly, I found that as I transcribe the stories and the questions and comments which follow the sharing, I discover patterns of learning for each child. Please listen as you read to note a gifted student building on to his personal learning as well on to the learning of his peers. The mathematical/logical intelligence appears to be dominate. The following action is student led

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THE SEVENTH RAINBOW --THE BLACK DUCK - by Bea (author reads/tells her story, as she invites her peers to mime the storyline which encouraged active listening, interpreting through mime and orchestration on the part of the author as she quickly incorporates each member of the community.

(see fig 1)

"The black duck was named the Black Duck. It swimmed in the water always.. the way along.
Everybody says a duck noise..(it was decided one person would quack)
Then the geese came.....
and then a rooster came.....
and then a horse came..... (as each new animal character was invited into the story he/she would make the appropriate noise.)

Then the horse and all of them swimmed away. Then a cow came and the little calf came. Then the duck quacked, flapped her wings and flied. Then the wild geese came (at this point she had all of her peers be geese).
The raccoon came and she sticked her tongue out and then a horse came and then a cow came and then a bull came and them a baby calf came and them a lamb came.

All the animals swimmed all the way back. A rainbow came. It was the Seventh Rainbow."

Jack hurried to make a rainbow with his colored pencils. Bea said, "Jack you be the rainbow." (He needed a minute to check the order of the colors in a rainbow. Everyone helped him. I had an excellent book available.)
(Bea continues.) "All the animals come home under the rainbow."

Teacher--"What about the black duck"

Bea--"Oh she is still in the water." (Someone quacked.)
Jack said. " I like the 7th rainbow and the duck." as he easily incorporated his treasure which he brought from home, a kaleidoscope, announcing "I have a rainbow trapped inside here. You have to turn it around and around to see the designs. It makes me think of bats."
Jack shared the designs drawn in detail in his scribbler dated March 11, 1993.

TUMMY ACHE by Jack

(Jack went to the chart paper which is on a stand built at the level of E.C.S. children. Using a felt pen he began to diagram and tell his true story. An example of reciprocal teaching.)
(see fig 2)

"This is about me having a tummy ache.
Here is my brain.
Here is my stomach.
Here is what the food looks like when it is in your stomach.
It looks like spaghetti.
And here are my bones.
In a dinosaur's body the bones are big. (looking at Tom, he draws to compare human bones with dinosaur bones. Tom, the dinosaur resident expert is dedicated to building dinosaurs from boxes, bones (cow, chicken) and any other materials that he can find.

At this point each member of the class asked Jack about their area of interest, which they are continually weaving into their learning. Jack easily continued comparing bones.

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"In a ballerina ..her bones are very flexible.(Tanya smiles)
Katty, a unicorn.. oh, her horn is a bone..her bones are big.
In a monkey's tail the bones are about 2 inches. (that was for Mary)
and in a horses leg..bones are bigger than a unicorn leg ..about 6 feet." (that was for Bea)

This led to some measuring and a story from a non-fiction book about our bodies. We also composed a poem on a big chart which I later printed onto a sheet and was run off for home reading. (see fig. 3)

ROLE OF THE TEACHER:

Teachers joining the community of learners become aware that their changing role is that of a facilitator. As teachers truly facilitate, learning becomes something that students do for themselves not for someone else. eg. (the teacher)

Differentiation begins to happen as students enjoy learning using their strengths and passion areas.

Students learn how to learn as they become involved in learning as a process rather than in lessons with closure.

The teacher begins to listen with new ears, to observe with new eyes, to provide scaffolding where needed, to find a mentor to join a child with a passion area, to ask a question to encourage higher level thinking.

1. Living Between the Lines by Lucy McCormick Calkins and
2. Bringing Out the Giftedness in Your Child by Rita Dunn, Kenneth Dunn and Donald Treffinger.

The above books help teachers and parents to become increasingly aware of the following questioning techniques.

QUESTIONING;
Beginning questions with--(why? How?)

Avoiding being judgmental ("Oh, isn't that good.") (1)

Avoiding being directive or leading-- ("Why don't you try it this way and see what happens?) (1)
Instead be reassuring -- ("I'm sure you will find ways to solve you problem.) (1)
Instead be reflective-- (I can see you have given a lot of thought to your conclusion) (1)
Consider unusual insights and perspectives. Instead of "That's silly,", try " I never thought of it quite like that" or " What makes you think that?" (2)
My favorite question is, " How do you see it?" (2)

Last but very important--a facilitating teacher surrounds the children with lots of good literature. Authors are wonderful mentors.

. CONCLUSION;

On going Education for life is about choice and taking responsibility for those choices. Our children working in environments where they see themselves as having a voice and making choices will result in young people taking charge and being responsible for their learning. THE BASICS, in this environment are seen as "Needed" and as an invaluable part of the big picture so that they can get on with the job.

For example-- ECS students begin to internalize the need for those squiggley marks we call an alphabet in order to save their personal and very important story. Robert James Waller in the forefront of this country's new fiction writers said, as he prepared to write,

> " I begin to see the images. first you must have the images,
> then come the words. And I begin to hear the words,
> begin to see them on pages of writing."

We as teachers and parents have the responsibility of helping our children to understand and to meet their unique needs.

.....

Inventive Momentum: Toward a Mature Artist

Robert Kelly
Springbank Community High School
Rocky View School Division

Canadian artist, Jack Shadbolt (1981), in his book *The Act of Art* provides an introspective look at his own experiences of rigorously propelling imagery through an intense serial exploration. Shadbolt states "This book is about how the act of art, once set in motion, gains its inventive momentum" (p. 1) The notion of inventive momentum is central to the development of the child as creative explorer and producer. It embodies the idea of driving a concept through new combinations and variations of visible form.

The principle of serial image production involves the conscious connection of visual imagery by the artist in the context of an expanding exploration. It is recognized that the artist's imagery is part of a dynamic continuum of the artist seeking vision. The works and processes of mature artists such as Shadbolt corroborate this notion.

When the principle of serial linkage of imagery is applied to the classroom setting, the art educator must construct a learning environment that is conducive to serial exploration. This includes establishing some sense of student ownership in creative problem solving situations to foster intrinsic motivation. MacGregor (1983) feels problems should be student originated. The teacher should allow for student input into problem formulation while sensitively guiding the student toward the exploration of new concepts.

Modes of assessment that nurture exploration and risk taking must be considered when encouraging serial exploration. Hennessey and Amabile in Sternberg (1988) stress the negative influence of assessment regimens that foster extrinsic motivation. Cooperative-reflective assessment between the teacher and student, and the student and his or her work is central to an assessment regimen that encourages a creative serial experience.

The teacher must also be acutely aware of conventions that could potentially limit avenues of exploration in the production of visual imagery. Koestler (1964) argues that rigid codification of cultural conventions can impede divergent thinking vital to a serial exploration. Rectangular formats and a penchant for two-dimensional expression are two conventions which often preclude exploration of diverse forms of visual imagery such as sculpture and format manipulation.

The seriality studio production model consists of a main serial exploration that is the culminating studio experience of a unit of study. The main serial exploration is preceded by a number of smaller studies all directed towards it. It approximates a studio production pattern employed by mature artists. The scope of the main exploration and its subordinate serializations are carefully designed by the teacher to incorporate concepts essential to the unit of study as dictated by student interest and art concepts specific to the study.

When this model is implemented it is important to allow an appropriate length of time to accommodate exploration to maintain inventive momentum. Lowenfeld (1982) stresses the importance of the depth approach in studio practice to foster exploration and experimentation. This should also allow the teacher adequate time to alert the student to linkages among the student's imagery. This idea of connectiveness among student ideas and imagery is central to a serial exploration.

The teacher should encourage the young artist to bring research to studio production problems. Renzulli (1983) underlines the importance of facilitating the development of the student as investigator. An investigator actively pursues stimuli for the purpose of producing his or her own sense of vision through the production of visual imagery. A file of reference material based on the student's interests is an important way of fueling a student's serial exploration.

The student must be equipped with numerous pictorial strategies that project the young artist's sense of vision. The teacher leads the student to discover important strategies that are essential for maintaining momentum in a serial exploration. The use of synectics based on the juxtaposition of disparate elements is one important method of leading students to these discoveries.

As students engage in serial explorations, the teacher plays the role of conceptual coach. In this capacity, the teacher applies appropriate questioning strategies that lead the student through the exploration of a concept. These questioning strategies are designed to encourage students to ask the questions a mature artist does.

Finally, when the principle of seriality is applied to studio production, it allows students to explore and experiment with visual imagery as they establish their own sense of vision. This is central to what mature artists do. It is important that more time should be spent developing the artist's disposition as opposed to largely teaching young people about art.

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Personalized Educational Programming for the Gifted/Talented Learner

Jo-Anne Koch
Rocky View School Division

Underlying Principles

- Intelligence is the capacity to solve problems or to fashion products which are valued in one or more cultural setting.
- There are many forms of intelligence, many ways through which people know and understand themselves and the world.
- Seven intelligences have been identified to date: verbal-linguistic, logical-mathematical, bodily-kinesthetic, visual-spatial, musical-rhythmic, social-interpersonal and personal-intrapersonal.
- While every person possesses all seven intelligences, most are stronger in some area(s) than in others and some people have pronounced strengths in one or more intelligence(s).
- A stronger, more dominant intelligence can be used to train (improve and strengthen) a weaker intelligence.
- Giftedness, like intelligence, is a multifaceted, multilevel phenomenon, characterized by tremendous diversity of gifts and talents. Given this diversity, gifted and talented students have individualized [personalized] programming needs.
- Besides intelligences [abilities], individualized [personalized] educational programming plans also need to take into account a student's sustained interests and his/her learning styles, types or preferences.
- The area(s) in which a student demonstrates exceptionality, beyond that which can be accommodated through the regular classroom program, is (are) the area(s) in which the student needs individualized [personalized] educational programming.
- Effective individualized [personalized] educational programming requires the collection of assessment information that is relevant to the programming decisions being made. Potential assessment strategies/sources include: individual/group tests/batteries, student portfolios/work samples, rating scales, inventories, observation/checklists and interviews/questionnaires.
- Attention must be given in the individualized [personalized] educational programming plan to each of the basic components of an effective program for the gifted and talented: individualized basics, appropriate enrichment, effective acceleration, independence and self-direction, personal and social development, career exploration and counselling.
- Recognizing that individual differences exist suggests that all learning experiences (strategies/systems of delivery) are not suitable for all students in all circumstances.

PERSONALIZED EDUCATIONAL PROGRAMMING PLAN

Developed by:
Jo-Anne Koch

Student's Name: _____ Grade: ____ Year: _____

STUDENT PROFILE

ABILITIES

General

- ☐ Rapid learner; masters content, skills, concepts, & processes sooner (at an earlier age), faster (with less practice) and more thoroughly (in greater depth and breadth)
- ☐ Highly inquisitive/intensely curious; has interests that are widely eclectic and intensely focused
- ☐ Creative; imaginative, inventive, versatile & adaptive in thought, expression, or action

Verbal–Linguistic

- ☐ Large & advanced vocabulary
- ☐ Large storehouse of information
- ☐ Proficient communicator in one or more foreign language(s)
- ☐ Reads widely, intensely and at an advanced level
- ☐ Effectively uses language (spoken or written) to entertain, inform explain, reflect or convince others
- ☐ Sensitive to the meaning & structure of language
- ☐ Keen sense of humor

Logical–Mathematical

- ☐ Strong powers of abstraction, conceptualization and synthesis abilities
- ☐ Easily masters math skills, concepts and processes
- ☐ Adept at experimental inquiry; readily formulates hypotheses, skillfully conducts research
- ☐ Well-developed problem solving reasoning & decision-making skills
- ☐ Uses logic to organize information and discover patterns, relationships and connections
- ☐ Readily grasps underlying principles, generalizes skillfully, makes valid assumptions

Bodily–Kinesthetic

- ☐ Handles body with ease & poise
- ☐ Adept at mimicry; effectively uses gestures and facial expression to communicate thoughts and feelings
- ☐ Well-developed physical/gross motor skills
- ☐ Well-developed fine motor/eye-hand coordination skills
- ☐ Good sense of timing & sequence

Visual–Spatial

- ☐ Sensitive to aesthetic quality and intrinsic beauty of things
- ☐ Visualizes skillfully; forms vivid mental images
- ☐ Strong directionality and orientation-in-space skills
- ☐ Artistic and productive in one or more medium (drawing, painting, sculpting, designing, drafting, photography)

Musical–Rhythmic

- ☐ Easily learns, remembers and accurately reproduces melodies
- ☐ Excels in musical ability (sings, plays one or more instrument(s), composes music, writes lyrics)
- ☐ Sensitive to non-verbal sounds in environment
- ☐ Has an ear for pitch, tonal quality, timing and rhythm
- ☐ Appreciates poetry

Social–Interpersonal

- ☐ Naturally assumes leadership roles; takes initiative & assumes responsibility
- ☐ Demonstrates character & integrity by expecting & practicing qualities of honesty, fairness & enterprise
- ☐ Sociable; responds and relates well to children and adults
- ☐ Unusually sensitive to other people's moods, temperament, motivations, intentions

Personal–Intrapersonal

- ☐ Keenly aware of personal thought processes, motivations, emotions & spirituality
- ☐ Well-developed sense of self; realistic about capabilities and limitations
- ☐ Works well independently; organized, conscientious and tenacious
- ☐ Unusually long attention span; sustains long periods of concentration

STYLES/TYPES/PREFERENCES

Processing

☐ Analytic	☐ Global	☐ Successive	☐ Simultaneous
☐ Abstract	☐ Concrete	☐ Sequential	☐ Random
☐ Field Dependent	☐ Field Independent	☐ Impulsive	☐ Reflective
☐ Observing	☐ Doing	☐ Thinking	☐ Feeling
☐ Right Hem.	☐ Left Hem.	☐ Sensing	☐ Intuiting
☐ Active	☐ Passive	☐ Judging	☐ Perceiving

Psysiological/Envivonmental

Perceptual:	☐ Visual	☐ Auditory	☐ Tactile/Kinesthetic	
Peak Time:	☐ Early AM	☐ Late AM	☐ Afternoon	☐ Evening
Mobility:	☐ Little	☐ Some	☐ Much	
Sound:	☐ Quiet	☐ Talking	☐ Music	☐ Varied
Lighting:	☐ Dim	☐ Bright	☐ Either	
Design:	☐ Formal	☐ Informal	☐ Either	
Temperature:	☐ Cool	☐ Warm	☐ Either	

Motivation/Responsibility

☐ External	☐ Internal
☐ Extrinsic	☐ Intrinsic
☐ Cautious	☐ Risk-Taker
☐ Procrastinates	☐ Scrupulous
☐ Persistent	☐ Gives up Easily
☐ Reluctant	☐ Enthusiastic
☐ Focused	☐ Distractible

Personality

☐ Extrovert	☐ Introvert
☐ Optimist	☐ Pessimist
☐ Competitive	☐ Cooperative
☐ Conformist	☐ Non-Conformist
☐ Perfectionist	☐ Indifferent
☐ Dependent	☐ Independent
☐ Confident	☐ Tentative

Instructional

Choices:	☐ Many	☐ Some	☐ No	
Direction:	☐ Much	☐ Some	☐ Little/No	
Feedback:	☐ Immediate	☐ Frequent	☐ Seldom	
Grouping:	☐ Self	☐ Pair	☐ Sm Group	☐ Lge Group
Tempo/Pace:	☐ Rapid	☐ Slow	☐ Variable	
Preferred Output:	☐ Oral Expressive	☐ Written Expressive		

Delivery:

☐ Lecture	☐ Drill & Recitation	☐ Teaching Games
☐ Discussion	☐ Independent Study	☐ Simulations
☐ Projects	☐ Programmed Learning	☐ Peer Teaching

INTERESTS

Scholastic Non-Scholastic

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Student's Name: _____ Grade: ____ Year: _____

PROGRAMMING COMPONENTS AND STRATEGIES/SYSTEMS OF DELIVERY

INDIVIDUALIZED BASICS

Subject/Area(s): _____

- ☐ Nurture & build upon stronger abilities, styles and interests
- ☐ Develop/strengthen weaker abilities, styles and interests
- ☐ Group/Cluster for instruction based on: ☐ Abilities ☐ Interests ☐ Needs
- ☐ Alternate learning tasks/products
- ☐ Flexible scheduling
- ☐ Learning Centers/Laboratories
- ☐ Programmed/Computer-Assisted Learning
- ☐ Independent Study
- ☐ Contractualized Learning
- ☐ Additional/alternate course(s) (specify)

_____

- ☐ Inter/Multi-Disciplinary units/course(s) (specify)

_____

- ☐ Correspondence/Distance Learning Course(s) (specify)

_____

- ☐ Peer Tutoring
- ☐ Intramural/Extracurricular activities (specify)

_____

- ☐ Other:

_____

_____

_____

APPROPRIATE ENRICHMENT

Subject/Area(s): _____

General Enrichment
- ☐ Type I Activities
- ☐ Type II Training

Cognitive Processes (specify)

_____

_____

_____

Affective Processes (specify)

_____

_____

Supplementary Enrichment
- ☐ Type I Activities (specify)

_____

_____

- ☐ Type II Mini-Courses (specify)

_____

_____

_____

Advanced Enrichment
- ☐ Type II Seminars (specify)

_____

_____

_____

- ☐ Type III Projects
  - ☐ Investigations
  - ☐ Inventions
  - ☐ Artistic Productions

EFFECTIVE ACCELERATION

Subject/Area(s): _____

- ☐ Test-Out (skills/content)
- ☐ Curriculum Compacting
- ☐ Independent Study
- ☐ Modified tempo & pace of learning activities
- ☐ Alternate level learning tasks/materials/resources
- ☐ Content Acceleration
- ☐ Credit by Examination
- ☐ Concurrent Enrollment (specify)

_____

- ☐ Continuous Progress
- ☐ Honors/IB/AP Course(s) (specify)

_____

- ☐ Course Advancement (specify)

_____

- ☐ Cross/Multi-Age Grouping
- ☐ Cross-Age Tutoring
- ☐ Correspondence/Distance Learning Course(s) (specify)

_____

- ☐ Off-Campus Special Placement(s) (specify)

_____

- ☐ Early Entrance
- ☐ Grade Advancement
- ☐ Other:

_____

_____

INDEPENDENCE & SELF-DIRECTION

Gradual development of self-management/learning-to-learn skills:

- ☐ Goal-setting
- ☐ Self-appraisal of:
  - ☐ Abilities
  - ☐ Styles, Types, Preferences
  - ☐ Interests
  - ☐ Programming Needs
- ☐ Task Commitment
- ☐ Conducting, presenting & evaluating projects
- ☐ Record-Keeping

- ☐ Other:

_____

_____

PERSONAL AND SOCIAL DEVELOPMENT

- ☐ Reading biographies/auto-biographies of famous/eminent people
- ☐ Understanding and coping with potentialities and limitations
- ☐ Understanding and tolerance of others
- ☐ Working effectively in groups
- ☐ Building a positive self-image/self-concept
- ☐ Peer Support
- ☐ Leadership Training
- ☐ Public Speaking and Debating
- ☐ Ethics & Moral Reasoning
- ☐ Contests, Competitions

- ☐ Other:

_____

_____

CAREER EXPLORATION & COUNSELLING

- ☐ Visitors, guests
- ☐ Visitations, field experiences
- ☐ Job Shadowing
- ☐ Mentorships
- ☐ Internships
- ☐ Apprenticeships
- ☐ Community Service
- ☐ School Service
- ☐ Individual/small group counselling sessions

- ☐ Other:

_____

_____

_____

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References/Resources

ABILITIES

"Abilities Analysis Worksheet", Talent Scout, Carol Powell, MIND RESOURCES INC.

Creativity Assessment Packet, Frank Williams, D.O.K. PUBLISHERS

Frames of Mind, Howard Gardner, ZEPHYR LEARNING MATERIALS

"Purdue Academic Rating and Vocational Talent Scales", John Feldhusen, et.al.

SAGES, SAGES-P, Susan K. Johnson, PRO-ED

Scales for Rating the Behavioral Characteristics of Superior Students, J.Renzulli et.al., CREATIVE LEARNING PRESS

Seven Ways of Knowing: Teaching for Multiple Intelligences, David Lazear, SKYLIGHT PUBLISHING COMPANY

STYLES/TYPES/PREFERENCES

CAP-Sol, PROCESS ASSOCIATES

The Class Activities Questionnaire, Joe M. Steele, CREATIVE LEARNING PRESS

The 4-MAT System: Teaching to Learning Styles with Right/Left Mode Techniques, Bernice McCarthy, EXCEL INC.

Learning and Teaching Style in Theory and Practice, Kathleen A. Butler, THE LEARNER'S DIMENSION

Learning Style Indicator: A Measure of Student Preferences for Instructional Techniques, J.Renzulli & L.Smith, CREATIVE LEARNING PRESS

Learning Style Inventory, Rita Dunn et.al., PRICE SYSTEMS INC.

Learning Style Inventory, J.Renzulli & L.Smith, CREATIVE LEARNING PRESS

Learning Style Inventory - Primary, Janet Perrin, PRICE SYSTEMS INC.

The Murphy-Meisgeier Type Indicator for Children, C. Meisgeier & E. Murphy, CENTER FOR APPLICATION OF PSYCHOLOGICAL TYPE (CAPT)

Myers-Briggs Type Indicator, Isabel Briggs Myers CAPT

People Types & Tiger Stripes, Gordon Lawrence, CAPT

"What Lights Me Up", Choosing & Charting, J.Eichberg and L.Redmond, CENTER FOR CREATIVE LEARNING

INTERESTS

My Book of Things and Stuff: An Interest Questionnaire for Young Children, Ann McGreevy, CREATIVE LEARNING PRESS

The Interest-A-Lyzer, J.Renzulli, CREATIVE LEARNING PRESS

"What Makes Me Tick", Choosing & Charting, J Eichberg and L. Redmond, CREATIVE LEARNING PRESS

PROGRAMMING

Blending Gifted Education With The Total School Program, D.Treffinger, CENTER FOR CREATIVE LIVING

Gifted Intervention Manual (& Gifted Evaluation Scales), Diana Henage, HAWTHORNE EDUCATIONAL SERVICES

Gifted Learners K-12, Kenneth R. Chuska, NATIONAL EDUCATIONAL SERVICES

Gifted Student Planner, B. Parke and P. Wood, EXCEPTIONAL INNOVATIONS INC.

It's All in Your Mind: A Student's Guide to Style, Kathleen Butler, THE LEARNER'S DIMENSION

Seven Ways of Teaching, David Lazear, SKYLIGHT PUBLISHING INC.

Talent Scout, Carolyn Powell, MIND RESOURCES INC.

Teaching Gifted Kids in the Regular Classroom, Susan Winebrenner, FREE SPIRIT PUBLISHING INC.

Teaching Students Through Their Individual Learning Style, Rita and Kenneth Dunn, PRICE SYSTEMS INC.

Type Tales: Teaching Type to Children, Diane Farris, CONSULTING PSYCHOLISTS PRESS INC.

Publishers/Distributors Addresses

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Gainsville, Florida
32609

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Honeoye, New York
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Palo Alto, California
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CREATIVE LEARNING PRESS INC.
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Mansfield Center, Connecticut
06250

D.O.K. PUBLISHERS INC.
71 Radcliff Rd.
Buffalo, New York
14214

EXCEL INC.
200 West Station Street
Barrington, Illinois
60010

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Ann Arbor, Michigan
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FREE SPIRIT PUBLISHING INC.
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Palatine, Illinois
85711

Social Style / Learning Modes • Relation to Giftedness

Jim Lavers
Education Programs

An outline of the presentation with considerable support material was given to participants and is included here as a matter of record.
For those not familiar with the use of certain words, as used in Neuro-Linguistic Programming standard terminology, an additional page covering Rapport, Pacing and Leading was added.

The thesis is that giftedness could be, in some cases may be, perceived as those skills and capacities inherent in persons of high auditory, digital, linear thinking modes. (1)
As a subset of this thesis researchers and practitioners would want to recognize the influence of their, and particularly evaluator's, Social Style which, for present purposes, may be considered the personality development and a dominant learning mode "writ large".
This means that the arbiter of giftedness must examine what the mores are for giftedness, their own perception, world view, ie: "map" of the"territory" and favored learning modes.

It is possible, therefore, that giftedness is, as much as anything, in the eyes of the beholder taking into account historical, elitist frameworks.

We simply do not know much about giftedness since seldom do we have an interactive curriculum taught by teachers trained to establish rapport, and, thus, pace and lead the participants in <u>their</u> best mode(s).

Nearly everone shys away from working in anything but their best mode(s) and if the institution insistson ones that are difficult for a participant then, ultimately, that individual fails, is perceived as a dullard, more or less, or persists by reinventing the wheel("translating" everything to acceptable information sorting in <u>their</u> modes) thus moving toward success - using their own view of reality (perceptual map).

Another factor seldom taken into account in curriculum or evaluation design is that of time orientation. Power testsseldom supplant speed tests, nor are

(1) Ivan Illich,<u>Conversations</u>,notes that societies continue to pay for these people's education at the expenseof those less 'successful'(by that criteria).

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they designed to present information in other than left to right(historical) or linear modes.
If an individual has a strong submodality preference, say for distance or non-linear time or space orientation they may be seriously handicapped and may not be perceived as gifted or even of normal intelligence.

Meeker, after Guilford's seminal work on multi-faceted intelligence measurement, attempts to get at this problem in two ways. In both s/he fails somewhat.

I. By offering an evaluation scale which allows for "chunking up",ie; Evaluation and Divergent Thinking, Meeker gets at, probably, some of these submodality functions but, basically (in fairness she does make all sorts of peripheral suggestions),the evaluation and support systems are linear. Astounding results have been obtained where LOCAN (a totally figural system) is "added"- actually is the starting/integrating factor - in the pedagogical system.

So who <u>is</u> gifted, and how?

II. Meeker, An Interpretation Guide P.16/17, clearly defines three areas of giftedness, but certainly stops short of equating them.
Her/s bias for presumption that auditory, digital linear modes are the sine qua non of intellect shows (What else is there?).

It is likely that if the evaluation instruments were derived differently, if the teaching methodology were completely interactive (40% auditory, 60% Visual, Kinesthetic,Olfactory,Gustatory <u>as the first approach</u>), the "results" and presumptions therefrom would be biased - but <u>toward</u> the non-linear, analog thinker.

To return to the original thesis, stated as a SUMMARY: GIFTEDNESS <u>MAY</u> BE A REFLECTION OF POLITICS, ASSESSMENT METHODS AND SOCIAL STYLE UNLESS MEEKER'S PARADIGM IS A CONSTANT REMINDER.
To which must now be added that Meeker's Paradigm falls far short of being

inclusive, nor does it provide truly alternative methods of assessment. Those have been derived by others who have found this and other assessment tools wanting.

The more subtle and subliminal the system by which we do our valuing, that is our favored sub modalities functioning, the more unlikely we are to recognize other modes as equally valid and engendering, explicating gifted functions which we are unwilling or unable to recognize.
If, as is almost always the case, a social bias, based on presumptive, elitist and largely unfounded criteria is added it is little wonder that about half our students leave school after nominal completion, or before, dissatisfied.

A seven year study, using the D.A.T.(admittedly not the best tool, but the only one available) showed that, at least for the eight broad categories of academic and performance scales, those leaving school were at least the intellectual equals
(2) of those who matriculated.
This led me, over the next decade, to begin to examine the motivation, criteria and moral discipline used to generate notions (which further entrench existing mores) about who shall matriculate, on what criteria and what is the nature, use and abuse of evaluations, including those relating to giftedness.

A word about values. At the societal level they do not die easily - note the struggle to maintain them over the last five hundred years by indigenous peoples in Meso-America.
This means that if we eliminate them then we are measuring something - but what?
Probably we are using criteria from a particularily materialistic society(ours) for "our" particular needs and to fortify our notions about productivity rather than legitimate social ordering/interaction or creativity as an axiom of culture.
It must be remembered that the first indications of culture, creativity, of giftedness came from visual art.
We largely ignore that, or set it aside, in our attempts to assess giftedness matching our value system.

(2) by far the "brightest" were aboriginal children- at that time none went beyond grade ten.

The dominant Social Styles in our culture are productivity oriented, ie;
(3) Acquisitors and Intellectuals and their thought processes are linear, digital. The sub modalities in evidence in the Corporate world which now dominates governments, social institutions and priorities, are those of the linear, digital auditory thinker. The analog is seconded to justify and ensure that the linear modes prevail.

Is it not likely, then that these modes dominate our cultural, intellectual, pedagogical choices thus limiting severely the criterion and range of what we consider true, good, worthy, acceptable, useful, intellectual?

More philosophically; giftedness may reflect society's needs rather than
(4) innate value or perception of highly developed human beings.
Mary Meeker says as much in her summary P.17 An Interpretation Guide where she points out the social needs of those identified in her Area 1 and the reverse for those in Area 3.

James F. Lavers.
93/10/19.

NOTES:

1. Inclusiveness.

The " words" Her/s and S/he are not typos. They are intended to note the contribution of Robert as well as Mary Meeker. Please do not change these.

2. Readers will simply have to guess, or use their own experience/background regarding N.L.P terms ie; Map/Territory,Pace/Lead or in regard to Meeker Paradigm nomenclature. (These could be added to the summary from the material provided.).

J.L..

(3) see Lapham; Money and Class In America. particularily page 54,55.

(4) we are beginning to come full circle; see CHAOS,James Gleick, notably pages 186 (bottom half) re: Van Gogh and P.229"There are very deep reasons,..., in society.....to dislike some aspects of our conception of nature".

The International Mathematics Tournament of the Towns

Andy Liu
University of Alberta

The Tournament is a very unusual mathematics competition for junior and senior highschool students. The participants from all over the world write the contest papers locally. The emphasis is on solving within a very generous time allowance, a small number of interesting problems, rather than on solving a large number of essentially routine problems at break-neck speed. The participants will learn the important skill of constructing written presentations of arguments.

The Tournament was born in 1980 in the former Soviet Union. It was organized by a group of dedicated mathematicians, most of whom were and still are based in Moscow, under the direction of Prof. Nikolay Konstantinov. Due to the efforts of Prof. Jordan Tabov of Bulgaria and Prof. Peter Taylor of Australia, the Tournament first spread to the former Eastern Block and then to the whole world.

There is a Junior Tournament for students in Grades 7 to 10, and a Senior Tournament for students in Grades 11 and 12. Students in lower grades within each Tournament write the same papers, but have their raw scores multiplied by a factor greater than one.

Each Tournament consists of a Fall Round and a Spring Round. Each Round consists of an Ordinary-Level Paper and an Advanced-Level Paper. A participant can write all four papers in a Tournament, with the final score being the best of the four.

There are four or five problems in an O-Level Paper. They are easier but worth less points. The participants are allowed four hours. There are six or seven problems in an A-Level Paper. They are harder and worth more points. The participants are allowed five hours. In each Paper, only the best three problems count.

A selection of fifty beautiful problems from the first ten Junior Tournaments are appended. They may serve to heighten or awaken the interest in mathematical problem-solving of your students or children. Ask them to have a go at it, and try them yourself too. While some problems may sound technical, others are certainly very down-to-earth.

If your youngsters have had a crack at the problems and would like someone to check their solutions, they may send them to me at the following address:

Prof. Andy Liu,
Department of Mathematics,
The University of Alberta,
Edmonton, Alberta, T6G2G1.

Alternatively, you may purchase the following publications:
(1) Tournament of the Towns, Questions and Solutions, 1980-1984.
(2) Tournament of the Towns, Questions and Solutions, 1984-1989.
The first sells, in Australian currency, for $18, and the second $20. There is also a $1 handling charge per book. The third book may soon be ready. Payment by Visa or Mastercard is preferred. The books may be ordered from:

Australian Mathematics Trust,
The University of Canberra,
P.O.B. 1, Belconnen,
A.C.T. 2616, Australia.

I hope that there may be sufficient interest in your school or town to take part in the Tournament. If you are in the Greater Edmonton area, we have participated in three Tournamets already, and you are most welcome to join. Our students usually write the contest papers at the University of Alberta on Sunday afternoons.

The Tournament does not offer prizes, to de-emphasize its competitive aspect. Nevertheless, deserving participants will receive much valued diplomas from Moscow, in Russian. We augment them with book prizes, as well as certificates for all local participants.

If you are in another urban centre, I am more than happy to help you set up a local committee. There is an entry fee, in U.S.A. currency, of $50 plus $3 per 100,000 in local population, to be paid to Moscow. The students' papers are first graded locally, and the best ones are forwarded to Moscow. I will supply solutions and suggest grading schemes.

If you are in a rural area and have difficulty setting up a local committee, I am sure I can persuade Moscow to allow your youngsters to participate under the banners of an appropriate urban centre.

In recent years, two supplementary activities have also been implemented. The first is a year-round correspondence school. Training problems are supplied by Moscow. Students work on them and send their solutions to me for checking and feedbacks.

The second is a summer school in Russia. In 1993, it was held in Beloretsk. I accompanied two Greater Edmonton area highschool students on this mathematical journey. A write-up about it is also appended.

International Mathematics

Tournament of the Towns

Selected Junior Problems.

Problem 1.
Find all permutations $(a_1, a_2, \ldots, a_{101})$ of the numbers 2, 3, ..., 102 in which a_k is divisible by k for all k.

Problem 2.
ABCD is a convex quadrilateral inscribed in a circle with centre O. AC is perpendicular to BD. Prove that the broken line AOC divides the quadrilateral into two parts of equal area.

Problem 3.
Each of 64 friends simultaneously learns one different item of news. They begin to phone one another to tell them their news. Each conversation lasts exactly one hour, during which time it is possible for two friends to tell each other all of their news. What is the minimum number of hours needed in order for all the friends to know all of the news?

Problem 4.
A game is played on an infinite plane. There are fifty-one pieces, one "wolf" and fifty "sheep". There are two players. The first commences by moving the wolf. Then the second player moves one of the sheep, the first player moves the wolf, the second player moves a sheep, and so on. The wolf and the sheep can move in any direction through a distance of up to 1 metre per move. Is it true that for any starting position, the wolf will be able to capture at least one sheep?

Problem 5.
In a certain country, there are more than 101 towns. The capital of this country is connected by direct air routes with 100 towns, and each town, except for the capital, is connected by direct air routes with 10 towns. It is known that from any town, it is possible to travel by air to any other town, changing planes as many times as is necessary. Prove that it is possible to close down half of the air routes connected with the capital, and preserve the capability of traveling from any town to any other town within the country.

Problem 6.
(a) A circle is divided into 10 equal arcs by 10 points. These points are joined in pairs by 5 chords. Is it necessarily true that 2 of these chords are of equal length?
(b) A circle is divided into 20 equal arcs by 20 points. These points are joined in pairs by 10 chords. Is it necessarily true that 2 of these chords are of equal length?

Problem 7.
A pedestrian walked 3.5 hours. In every period of one hour's duration, he walked 5 kilometres. Is it true that his average speed was 5 kilometres per hour?

Problem 8.
The positive integer K is obtained from another positive integer M by scrambling its digits.
(a) Prove that the sum of the digits of 2M is equal to that of 2K, and the sum of the digits of M/2 is equal to that of K/2.
(b) Prove that the sum of the digits of 5M is equal to that of 5K.

Problem 9.
A version of billiard is played on a right triangular table, with a pocket in each of the three corners. A ball is played from just in front of the pocket at the 30° angle, towards the midpoint of the opposite side. Prove that if the ball is played hard enough, it will land in the pocket at the 60° angle after 8 bounces.

Problem 10.
Prove that in any set of 17 distinct positive integers, either there are five each dividing the next or there are five none of which divides any of the other four.

Problem 11.
In a ballroom dance class, 15 boys and 15 girls are lined up in parallel rows so that 15 couples are formed. It so happens that the difference in height between the boy and the girl in each couple is not more than 10 centimetres. The boys and girls are rearranged in their respective rows in descending order of height, and 15 new couples are formed, matching the tallest boy with the tallest girl. Prove that in each of the new couples, the difference in height is still not more than 10 centimetres.

Problem 12.
Show how to cut an isosceles right triangle into a finite number of isosceles right triangles every two of which are of different sizes.

Problem 13.
In each of the pairs (8,9) and (288,289), each number contains each of its prime factors to a power no less than 2. Prove that there are infinitely many such pairs of consecutive positive integers.

Problem 14.
A village consists of 9 blocks in a 3 by 3 formation, each block a square of side length 1. Each block has a paved road along each side. Starting from a corner of the village, what is the minimum distance we must travel along paved roads, if each section of paved road must be passed along at least once, and we are to finish at the same corner?

Problem 15.
A quadrilateral has a vertex on each side of a given rectangle. Prove that the perimeter of the quadrilateral is not smaller than double the length of a diagonal of the rectangle.

Problem 16.
M is a set of points in the plane, no three on a line. Some points are joined to others by line segments, with each point connected to no more than one line segment. If we have a pair of intersecting line segments AC and BD, we may replace them with AB and CD. In the resulting system of segments, if there are still pairs of intersecting segments, we may make a similar replacement. Is it possible for such replacements to continue indefinitely?

Problem 17.
Six musicians gathered at a chamber music festival. At each scheduled concert, some of these musicians played while the others listened as members of the audience. What is the minimum number of such concerts in order to enable each musician to listen, as a member of the audience, to all the other musicians?

Problem 18.
On the Island of Camelot live 13 grey, 15 brown and 17 crimson chameleons. If two chameleons of different colours meet, they both simultaneously change to the third colour. Is it possible that they will eventually all be the same colour?

Problem 19.
There are 68 coins, each having a different weight from that of one another. Show how to find the heaviest coin and the lightest coin in 100 weighings on a balance.

Problem 20.
Find all solutions of the system of equations $(x+y)^3=z$, $(y+z)^3=x$ and $(z+x)^3=y$.

Problem 21.
Three grasshoppers are on a straight line. Every second, one of the grasshoppers jumps across one, but not both, of the other two grasshoppers. Prove that after 1985 seconds, the grasshoppers cannot all be in their initial positions.

Problem 22.
The first number of a sequence is 1. Each subsequent number is the sum of the preceding number x and the sum of the digits of x. Can the number 123456 belong to this sequence?

Problem 23.
A square is divided into 5 rectangles in such a way that its 4 vertices belong to 4 of the rectangles, whose areas are equal, and the fifth rectangle has no points in common with the sides of the square. Prove that the fifth rectangle is a square.

Problem 24.
The digits 0, 1, 2, ..., 9 are written in a 10 by 10 table, each number appearing 10 times.
(a) Is it possible to write them in such a way that in any row or column, there would be no more than 4 different digits?
(b) Prove that there must be a row or column containing more than 3 different digits.

Problem 25.
In a tournament, each of eight football teams plays every other team once. There are no ties. Prove that at the end of the tournament, it is possible to find four teams A, B, C and D such that A beats B, C and D, B beats C and D and C beats D.

Problem 26.
Two people toss coins. One tosses his 10 times, the other tosses his 11 times. What is the probability that the second person has more "heads" than the first?

Problem 27.
Through vertices A and B of triangle ABC are drawn two lines which divide the triangle into three triangles and a quadrilateral. Three of these four regions have equal area. Prove that one of them is the quadrilateral.

Problem 28.
There are 20 football teams in a tournament. On the first day, all the teams play one game. On the second day, again all the teams play one game. Prove that after the second day, it is possible to select 10 teams no two of which have played each other.

Problem 29.
We are given two two-digit numbers x and y. It is known that x is twice as big as y. One of the digits of y is the sum, while the other digit of y is the difference, of the digits of x. Find all values of x and y.

Problem 30.
In a game with two players, there is a rectangular chocolate bar with 60 pieces arranged in a 6 by 10 formation. It can be broken only along the lines dividing the pieces. The first player breaks the bar along one line, discarding one section. The second player then breaks the remaining section, discarding one section. The first player repeats this process with the remaining section, and so on. The game is won by the player who leaves a single piece. In a perfectly played game, which player wins?

Problem 31.
Consider subsets of the set $\{1,2,\ldots,N\}$. For each such subset, we compute the product of the reciprocals of all members. Find the sum of all such products.

Problem 32.
Prove that $3(1+a^2+a^4)\geq(1+a+a^2)^2$ for all real number a.

Problem 33.
We are given tiles in the form of right triangles having perpendicular sides of lengths 1 centimetre and 2 centimetres. Is it possible to form a square from 20 such tiles?

Problem 34.
A machine gives out five pennies for each nickel and five nickels for each penny. Can Peter, who starts out with one penny, use the machine several times to end up with an equal number of nickels and pennies?

Problem 35.
Nine pawns form a 3 by 3 square at the lower left corner of an 8 by 8 chessboard. Any pawn may jump over another one standing next to it onto an empty square directly beyond. Jumps may be horizontal, vertical or diagonal. It is desired to reform the 3 by 3 square at another corner of the chessboard by means of such jumps. Can the pawns be so rearranged at the
(a) upper left hand corner;
(b) upper right hand corner?

Problem 36.
Prove that the second last digit of each power of three is even.

Problem 37.
In a game, two players alternately choose larger positive integers. At each turn, the difference between the new and the old number must be greater than zero but smaller than the old number. The original number is 2. The player who chooses the number 1987 wins the game. In a perfectly played game, which player wins?

Problem 38.
We are given a figure bound by arc AC of a circle and a broken line ABC, with the arc and the broken line on opposite sides of the chord AC. Construct a line passing through the midpoint of arc AC which divides the figure into two regions of equal area.

Problem 39.
There are 2000 apples, contained in several baskets. One can remove baskets as well as apples from the baskets. Prove that it is possible to leave behind an equal number of apples of each of the remaining baskets, with the total number of apples not being less than 100.

Problem 40.
ABCD is a convex quadrilateral. The midpoints of BC and DA are M and N respectively. The diagonal AC divides MN in half. Prove that the areas of triangles ABC and ACD are equal.

Problem 41.
(a) The vertices of a regular decagon are painted alternately black and white. Two players take turns drawing a diagonal connceting two vertices of the same colour. These diagonals must not intersect. The winner is the player who is able to make the last move. In a perfectly played game, which player wins?
(b) Answer the same question for the regular dodecagon.

Problem 42.
Let a, b and c be positive integers such that $a=b+c$. Prove that $a^4+b^4+c^4$ is double the square of a positive integer.

Problem 43.
Is it possible to cover a plane with circles in such a way that exactly 1988 circles pass through each point?

Problem 44.
It is known that the proportion of people with fair hair among people with blue eyes is more than the proportion of people with fair hair among all people. Which is greater, the proportion of people with blue eyes among people with fair hair or the proportion of people with blue eyes among all people?

Problem 45.
In a triangle, two altitudes are not smaller than the sides on to which they are dropped. Find the angles of this triangle.

Problem 46.
To each vertex of a cube is assigned randomly the number 1 or the number -1. To each face of the cube is assigned the product of the four numbers at the vertices of the face. Is it possible that the sum of these 14 numbers is 0?

Problem 47.
Prove that $a^2+3b^2+5c^2 \leq 1$ where a, b and c are positive numbers satisfying $a \geq b \geq c$ and $a+b+c \leq 1$.

Problem 48.
What digit must replace "?" in the number 888...88?999...99, where there are fifty 8's and fifty 9's, in order that the resulting number is divisible by 7?

Problem 49.
Two players alternately moves a pawn on a chessboard from one square to another, subject to the rule that, at each move, the distance moved is strictly greater than that of the previous move. Distance is measured from the centre of the starting square to the centre of the destination square. A player loses when unable to make a legal move on his turn. Who wins if both use the best strategy?

Problem 50.
(a) Prove that if 3n stars are placed on the squares of a 2n by 2n board, then it is possible to remove n rows and n columns in such a way that all stars will be removed.
(b) Prove that it is possible to place 3n+1 stars on the squares of a 2n by 2n board in such a way that after removing any n rows and n columns, at least one star remains.

A MATHEMATICAL JOURNEY(Andy Liu)

In the summer of 1993, Matthew Wong of Old Scona Academic High School, Edmonton, and Daniel van Vliet of Salisbury Composite High School, Sherwood Park, were invited to attend an International Mathematics Tournament of the Towns Conference in Beloretsk, Russia, along with me. It was chaired by Prof. Nikolay Konstantinov, President of the Tournament and recent winner of the Paul Erdos Award from the World Federation of National Mathematics Competitions. Prof. Nikolay Vasiliev, who chairs the Problem Committee of the Tournament, was also present.

There were 60 participants in all. The 15 non-Slavs consisted of 1 Englishman, 2 Austrians, 3 Canadians, 4 Germans and 5 Columbians. Apart from Prof. Gottfried Perz of Graz, Austria, and me, the others are highschool or university students. Among the Slavs were some Bulgarians, Armenians and Estonians.

Beloretsk is in the Bashkirian Republic of Russia. It is just west of the Ural Mountains and north east of the Caspian Sea. The train ride from Moscow takes 36 hours each way. The time difference from Edmonton is 12 hours. So we had come literally to the other side of the world.

It is quite hot in Beloretsk on an August day, but comfortably cool in the morning and the evening. The population is about 100,000, spread over quite a large rural area. It is not uncommon to be followed by chicken and sheep while walking on the streets. There is just enough industry to give the economy a big boost, but the air and water are refreshingly clean.

The Beloretsk Computer School which hosted the Conference is at the edge of the town. It consists of the original school building and a new five-floor dormitory. The three of us shared a spacious, comfortable and well-furnished room. We were next to the Austrians, with whom we shared a sink, a toilet, a shower and a refridgerator. The landscape around the school is very picturesque. A nearby river was a favourite spot for swimming, and the site of a traditional Russian tea-party by the bonfire one evening.

Our daily routine was roughly as follows. Breakfast was at 9 in the morning. From 10 to 12, there was usually a Mathematical Education forum. From 12 to 2 was a problem session for the students. Lunch was at 2. From 3 to 5 ran another problem session. Supper was at 7, and occasionally another Mathematics Education forum ran from 8 to 10. The food was good.

The Conference began officially on August 1, even though our appetite had already be whetted by a problem set distributed on the train. During the first two days, four problems were presented to the students. The proposers provided some relevant background information. This was done in Russian, with adequate translation into English, which all 15 non-Slavs understand.

The students could work on the problems in their own rooms, in classrooms, on the meadows, or wherever they chose. They could work in teams, an option favoured mostly by the non-Slavs. The lone English student joined the Canadian team, but the lone Austrian student worked on his own.

The students had only until 10 o'clock in the evening of August 3 to solve the problems. Starting from August 4, solutions to those parts of the problems which had been solved were presented, along with a more challenging fifth problem.

The final deadline was at 10 o'clock in the evening of August 7. All solutions, as far as they are known to the proposers, were presented on August 8. During that afternoon, the participants were presented with diplomas, with very detailed descriptions of what they had accomplished, and whether their efforts were solo ones or in collaboration. I was most impressed with the meticulous care the jury had graded the students' work.

The Anglo-Canadian team did not win any prizes. We probably spent too much time socializing with the Russian students. However, I felt that this was just as important an aspect of our trip as working on the problems. The three of them did get some work done, and the jury commended them for formulating a generalization of one of the problems and making partial progress towards its solution. Matthew and Daniel continue to work on the problems. after their return.

On August 9, the last day of the Conference, solutions to the more difficult problems in this year's Tournament of the Towns were presented. Then we bid farewell to Prof. V. G. Khazankin, principal of the Beloretsk Computer School, and other friends. They included Mother Khazankin, Ilia, the eight-year-old son of one of the teachers, and Alexei. He is eight-three, a most interesting man who has collected lots of minerals and folklore from the Ural region.

We spent one night in Moscow on the way into, and two more on the way out of Russia. We stayed with Moscow mathematicians, who moved their families out temporarily so that we could have their apartments to ourselves. They are a very dedicated group. Besides running the Tournament, they organize the Independent University of Moscow, which keeps alive the famed tradition of the Moscow Mathematics Circles, without official recognition or financial support.

It was a wonderful experience, living in actual Russian homes. In the little time we had, we managed to get quite a bit of sightseeing done. We had an acute sense of the changing social fabrics at a very exciting time in the history of a nation which not many have had the privilege to observe first hand. It is a trip that leaves a lasting impression on each of us, mathematically and otherwise.

BELORETSK PROBLEMS(Andy Liu)

The following are three of the four problems proposed in the International Mathematics Tournament of the Towns Conference in Beloretsk, Russia, in August 1993. They are reconstructed from my notes and are not the exact formulations as were presented. Problem 3, which is very elaborate, is omitted.

I invite the readers to send me nice solutions to these problems. I will forward them to the proposers too. Bear in mind that they do not have all the solutions. If there is sufficient interest, I will discuss some of them in a follow-up article, which may include the missing Problem 3. I can reached at:

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Problem 1.
Proposer: Prof. A. A. Egorov.
Prize Winners:
V. Zamjatin, highschool student from Kirov, Russia.
A. Barkhudarian and V. Poladian, highschool students from Yerevan, Armenia.
A. Bufetov, highschool student from Moscow, Russia.
I. Buchkina and D. Schwarz, highschool students from Moscow, Russia.

Consider the following diophantine equation in x and y:
(*) $x^2+(x+1)^2+\cdots+(x+n-1)^2=y^2$,
where n is a given positive integer.
If (*) has infinitely many solutions, we say that n is infinitely good.
(a) Prove that 2, 11, 24 and 26 are infinitely good.
(b) Prove that there are infinitely many infinitely good positive integers.
If (*) has at least one solution with $x>0$, we say that n is very good.
(c) Prove that an infinitely good positive integer is very good.
(d) Prove that a positive integer which is very good but not infinitely good cannot be even.
(e) Prove that 49 is very good but not infinitely good.
(f) Prove that there are infinitely many positive integers which are very good but not infinitely good.
If (*) has at least one solution, we say that n is good.
(g) Prove that 25 is good but not very good.
(h) Prove that there are no other positive integers which are good but not very good.
If (*) has no solutions, we say that n is bad.
(i) Prove that 3, 4, 5, 6, 7, 8, 9 and 10 are bad.
(j) Prove that there are infinitely many bad positive integers.
(k) Devise an efficient algorithm which classifies a given positive integer as infinitely good, very good but not infinitely good, good but not very good, or bad.

Problem 2.
Proposer: Prof. N. Vasiliev.
Prize Winner: Yu. Belous, university student, Ekaterinburg, Russia.

A partition of a convex polygon into at least two triangles is called an anti-triangulation if whenever two of the triangles share a common segment, this segment is not a complete side of at least one of the two triangles.
(a) Determine all integers $k>1$ such that there exists an anti-triangulation of a triangle into k triangles.
(b) Prove that no anti-triangulations exist for a convex polygon which is not a triangle.
(c) Generalize the result to partitions into convex n-gons not sharing common sides for $n>3$.
(d) Generalize the result to partitions into tetrahedra not sharing common faces or not sharing common sides.

Problem 4.
Proposer: Prof. K. A. Knop.
Prize Winners:
Oleg Popov, highschool student, Moscow, Russia.
E. Tsyganov and V. Kartak, university students, Beloretsk, Russia.

In Russia, there are 1, 2, 3, 5, 10, 15, 20 and 50 kopeck coins. To make up an integral amount, we take at every stage the largest coin not exceeding the remaining part of the amount. This method is called the Greedy Algorithm. For example, to make up 29 kopecks, the Algorithm yields $29=20+5+3+1$.
A general coinage system consists of m coins of respective integral values $1=a_1<a_2<\cdots<a_m$. It is said to be suitable if for any integral amount, the number of coins used in the Greedy Algorithm is minimum.
(a) Prove that the Russian system is suitable.
(b) A new k kopeck coin is to be introduced into the Russian system. Determine all values of k for which the new system remains suitable.
(c) Prove that a general coinage system is suitable if a_{k-1} is divisible by a_k for $1\le k\le m-1$.
(d) Prove that a general coinage system is suitable if $a_{k-1}-a_k$ is constant for $1\le k\le m-1$.
(e) Devise an efficient algorithm for testing whether a given coinage system is suitable.
In a general coinage system S which is not necessarily suitable, denote by $f(S,k)$ the smallest number of coins required to make up the integral amount k. Denote by $g(S,n)$ the largest integral value such that $f(S,k)\le n$ whenever $k\le g(S,n)$, and by $g(m,n)$ the minimum value of $g(S,n)$ taken over all systems with m coins.
(f) Prove that $g(S,3)=28$ if S is the Russian coinage system.
(g) Determine $g(m,n)$ for specific values of m and n, or obtain upper and lower bounds.
Suppose we are only interested in making up integral amounts up to and including 100, but we wish to do so in as efficient a way as possible.
(h) Determine the minimum values of $m\cdot\max\{f(S,k):1\le k\le 100\}$ taken over all coinage systems S, where m is the number of coins in S.
(i) Determine the minimum value of $m(f(S,1)+f(S,2)+\cdots+f(S,100))$ taken over all coinage systems S, where m is the number of coins in S.

Operation Minerva Rocky View • Mentoring Young Girls in Science

Jean Makosz • Jan McGregor • Diane Bell • Joan Gusa • Tracey Wong
Operation Minerva

Science Conference for Girls, December 4-5, 1992.

Operation Minerva is a science conference, specifically designed to provide young girls with positive experiences in math, the sciences and technology. Minerva, the Roman goddess of the practical arts and crafts, was chosen to symbolize the training and skills required by those who work in these fields.

The Operation Minerva organization originated in Calgary under the direction of Joyce Luethy and a number of science based educators and professionals who were concerned about the limited numbers of women working in mathematical, scientific and technical careers. In 1992,the program was adopted by a small group of Rocky View teachers and parents who revised the program to meet the rural needs of their students.

Rationale and Conference Goals:

Throughout the Western world, there is concern that fewer females than males are employed in scientific and technical occupations, particularly those related to mathematics, physics and computer applications (Haggerty, 1987). Presently, only 9-10% of the workforce involved in science and engineering related careers in the U.S.A. and Canada are women (Klein, 1988).

In Canada, the number of females enrolled in math, science and technological courses begins decreasing in high school and continues throughout university (Calgary Herald, 1990).

The workplace in the 1990's is evolving and changing at an accelerated pace. With globalization and technological advances, many of the clerical, sales and service jobs, which presently employ large numbers of women will disappear.

The majority of young women will remain in the workforce for 25-45 years. The Canadian Teachers Federation (1988) has demonstrated that 85% of future careers will require the successful completion of at least high school math and science. Presently, women make up a larger percentage of the poor in Canada than men (Livingstone,1989). It is therefore very important that women develop the skills which will be necessary to access future employment.

We decided to target the Operation Minerva Conference towards grade 8 girls, as current research shows that this is the age when girls begin to lose interest in science and math. Young adolescent females who are trying to establish ego-identity and to win social approval are most often attracted to careers which enhance their feminine image (Head, 1979). In fact, the desire to belong to the peer group in adolescence is so strong that girls will hide their talents and diminish their individuality in an effort to conform (Batcher, 1987). Unless these girls receive strong encouragement from their teachers and parents, few will opt for a career in the sciences.

In grade 9, girls begin to make choices about the academic courses they will study in high school, and need to make educated decisions about their future careers. It is therefore important that they are introduced to positive female role-models and counsellors in scientific careers.

In regular science classrooms, girls seldom adopt leadership roles as boys often dominate classroom discussions and student-teacher interactions (Kelly, 1987). The Minerva committee wanted to create a supportive environment where girls could express themselves openly and without inhibition. They therefore decided that a "girls only" conference was appropriate.

The conference was finally designed to achieve the following objectives.

Conference Objectives:

1. Stimulate young women's awareness of and interest in careers in science, mathematics and technology.

2. Provide adolescent girls with positive experiences in science and technology.

3. Introduce positive female role-models and counsellors from the technical and scientific professions.

4. Encourage students to continue the study of science, math and technology in high school and further education.

5. Increase awareness in educational institutions and private corporations of the need to encourage female involvement in science and technology.

6. Give science a human face.

The Conference

A group of forty grade 8 students fom Middle schools within the Rocky View School Division had the opportunity to meet and "job-shadow" for one day with a female mentor working in one of the scientific professions. As often as possible, students were matched with mentors working in careers in which they had expressed an interest. Our list of mentors was extensive, including a dentist, anaesthetist, physiotherapist, family doctor, occupational therapist, lab. technician, geneticist, medical researcher, nurse, radiologist, veterinarian, biologist, marine biologist, park ranger, engineer, geologist and statistician.

Following their job-shadow experience, students returned to Rocky View Central Office to debrief. The girls were involved in ice-breaking and teamwork activities. They were also given the opportunity to socialize and have fun.

The second day of the conference was spent at the University of Calgary participating in a number of different "hands-on" science workshops which allowed the students to experience engineering, forensic science, bio-mechanics and biology.

Consequently, students had contact with a number of female mentors

and role-models, from a wide range of scientific fields, who were able to provide encouragement and career counselling. By allowing our students to experience a supportive network of female professionals, we hoped to present a "human face to science." We also tried to to break down the current, stereotypical image of the socially isolated, female scientist by introducing the girls to mentors with active social and family lives. At the conference, the girls were able to socialize with their own peer group, and to realize that there are many other girls interested in science careers.

Conclusions

Most girls who participated in the conference expressed interest in several, different careers, and hoped that their experience with Operation Minerva would allow them to gain an insight into at least one of these professions. Many students also saw the conference as a chance to widen their knowledge of different career opportunities. Others sought information which would allow them to choose high school courses wisely.

The majority of students expressed interest in science careers which could be labelled "nurturing," for example medicine, animal sciences and education. A much smaller percentage were interested in the "functional" sciences such as engineering, technology and applied sciences.

There is no doubt that the conference was a great success. The job-shadowing experience was highly praised, and longer and repeat sessions were requested. The mentors who provided students with practical and "hands-on" experiences were given the most positive evaluations. The university work-shops were also popular but were most beneficial when directly linked to students' interests. All of the students enjoyed the university experience.

When asked if the conference had helped them discover new careers, 72% of the girls said Yes, 25% said No, and 2% were undecided. In addition, 51% said that the conference was very helpful in allowing them to clarify their occupational goals, 42% said somewhat helpful, and 2% said not at all.

A number of girls expressed a desire to enter a scientific career but were still unaware of the necessary high school courses required. Few had discussed high school courses or science and technology careers with their teachers, indicating a need for further career counselling at the school

level.

Funding for the conference was provided by donations from Rocky View School Division, the Science Alberta Foundation, corporations and student registration fees. It is difficult to raise corporate donations during an economic recession. However, with volunteer help and a tight control of expenditure, the committee discovered that a massive fund-raising drive was not necessary to ensure an effective conference.

The women volunteers were an essential feature of Operation Minerva. Many professional women donated their time and energy to support and encourage young, female scientists.

The success of the conference is most easily described in the words of one of the students :

- This conference was great. It taught me a lot about actually working and hands-on experience. It was fun and educational..... The price was great and the activities were excellent. I hope in the future, I will get to talk to the Operation Minerva girls when I'm a civil engineer."

Jean Makosz for:

The Minerva Team:

Jan McGregor (Coordinator)
Diane Bell
Joan Gusa
Tracey Wong

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A Developmental Approach to Facilitating Knowledge Generalization

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Knowledge transfer is widely assumed to be central to development and learning. It is not surprising, therefore, that both the developmental literature and the instructional literature contain a large number of studies which aimed at producing transfer or at elucidating the conditions under which it takes place. What is more surprising, however, is the discovery that these studies have so far shown only a hint of success (Cormier & Hagman, 1987).

Historically, the move from the classical learning paradigm (Skinner, 1950) to the information processing paradigm brought about a shift in instructional focus from shaping specific skills, through successive approximation, to training very general "metacognitive" skills (Brown 1975; Pressley, 1982). Even under these new conditions, transfer proved resistant, however, because the application of metacognitive skills was typically limited to "near" transfer. By contrast, the sought after "far" transfer, which involved moving knowledge between domains and thereby forging links through conscious strategic activity, remained elusive (Perkins & Solomon, 1987).

Children's failure to engage spontaneously in what has been described as a "mindful backward search" (Solomon, 1988) eventually led researchers to turn their attention from teaching general metacognitive skills to directly teaching strategies or procedures designed to facilitate knowledge access (Bereiter & Scardamalia, 1985) and transfer (Brown & Campione, 1984). The aim of my work is to explore an approach which is believed to be compatible with that being developed by these investigators, but which has its origins in a different tradition - the Piagetian tradition.

Within the developmental literature, a similar historical progression from general to more specific structures has occurred. Piaget's theory stimulated a large number of training studies, because it suggested that the structures underlying concepts such as conservation were very general ones which should be very difficult to teach but which, if taught, should produce transfer to other structurally related tasks such as seriation and transitivity. What was actually found, however, was (a) that the concept could be taught without undue difficulty, at least above the age of 5 years, and (b) that, when it was taught, transfer only took place to different kinds of material, but never to other tasks whose only relation was that they shared the same underlying logical structure. (See Halford, 1982 a review.) Taken together with the data on decalages and low intertask correlations, this led to a view of development which held that separate skills or concepts were learned relatively independently of each other, and that transfer

across domains should therefore be a rare occurrence, if it ever took place at all (Siegler, 1981; Chi & Rees, 1983).

Recently, however, Case (in press) has proposed that certain structures may transcend conventionally defined domains. These structures, which he labeled *central conceptual structures* ,are presumed to be very broad in their field of application. Moreover, when taught, they are presumed to be capable of producing transfer to a wide variety of tasks which share the same conceptual underpinnings, but which require different domain-specific knowledge. The example he gives is the concept of a "quantitative dimension," which he claims is acquired at about the age of 6 under conditions of spontaneous acquisition, and which differentiates the performance of 4- and 6-year-old children on a variety of tasks as diverse as telling time, adding and subtracting numbers, determining the tilt of a balance scale, sight reading music, and making determinations of distributive justice.

Case and his colleagues have done several studies in which they have trained 4-year-olds in the concept of a quantitative dimension, and then observed transfer to these other tasks (Case & Sandison, 1988; Case & Griffin, in press). In the light of the usual dearth of transfer, their findings are of considerable theoretical as well as practical interest. Moreover, they would appear to be complementary to the findings being produced by investigators from other traditions. There is nothing incompatible between the suggestion that general strategies for knowledge accessing exist and can be taught, and the suggestion that general conceptual structures which are used for making sense of new content in different knowledge domains exist.

Case's findings are problematic, however, for at least 2 reasons. First, the work investigated a conceptual domain (i.e., mathematics) which has been charted in detail for some time and so it is possible that the transfer obtained was an artifact of the detailed understanding of the domain itself, rather than an understanding of children's developmental conception of it. Second, the tests of developmental change were applied to only a limited range of tasks; namely, those which shared a common set of cognitive operations peculiar to the logico-mathematico conceptual domain.

The goal of my recent work has been to provide a more stringent test of the concept of central conceptual structures by testing for far transfer in less well documented territory; that is, from an instruction program in the narrative composition to social problem solving tasks. The general theory holds that by (a) analyzing children's spontaneous conceptual development in a number of task domains, (b) identifying the central conceptual structures which operate across domains, and (c)

teaching the structures, we can bolster the utilization of knowledge across academic tasks. In order to test this assertion, groups of 4-year-old children were exposed to narrative-composition instruction developed according to two theoretical perspectives. The first, a neo-Piagetian approach, took into consideration developmental changes in children's central conceptual structures. These structures are more specific than Piagetian general structures in that they are related to domain specific knowledge, yet more general than the specific knowledge structures proposed by current information processing theorists in that they entail a conceptual understanding which, when acquired, permits a wide variety of other concepts to be acquired as well. The second instructional approach, based on the work of Donald Graves, used a process approach and taught children to relate exciting events in a narrative format. The prediction was that the neo-Piagetian instruction would produce not only greater improvements in performance on criterion-related measures (i.e., story composition and recall tasks) but, in addition, would yield greater transfer due to its emphasis on central representational structures. The three transfer tasks measured children's (a) understanding of a mother's motives, (b) empathic response to peers, and (c) knowledge of feeling definitions. Although these differ in surface features in that they deal with different content domains, age-appropriate performance in all 4 tasks domains requires a varying degree of understanding of *intentionality;* that is, an understanding of the reciprocal causal relations which exist between people's action and their mental states such as feelings and desires.

The finding that the developmental performance level in story composition and recall increased for the neo-Piagetian group, but remained unchanged for the Graves group, is significant in its own right. More germane to the issue of generalizibility in learning, however, is the finding that there also was considerable transfer. Taken together, these data not only confirm the pedagogical analysis, but confirm the developmental analysis as well, and suggest that the present approach offers a promising direction for the development of a new generation of cognitive curricula. Currently, I am expanding this work into the domain of Gifted Education. A study is underway that has a two-fold purpose: (a) to conduct extended analyses of the narrative compositions of children and adolescents (aged 4 to 18 years) and (b) to test for criterion-related instructional gains, as well as for knowledge transfer to a series of tasks that differ from narrative composition in terms of surface features but that share conceptual underpinnings.

In the first phase of the study, a multi-strand analysis of verbally talented 4-, 6-, 8- and 10-year-old children's narrative will be undertaken. The second phase focuses on instruction. Here, the instructional goals are to facilitate the development of an enriched narrative schema in average functioning kindergarten and grade 1 students

and to foster increased knowledge generalization to tasks that share an "intentional" structure (i.e., tasks based on an understanding that human action is motivated by internal mental states such as wants and feelings). Phases 3 and 4 extend the work into adolescence. The goal of Phase 3 is to refine the analysis of the "interpretive" narrative structure (i.e., knowledge that human intention is motivated by psychological factors that are formed across time and situations). The compositions of talented writers (aged 10, 12, 14, and 18 years) will be examined for evidence of a systematic increase in structural complexity. In phase 4 , a program of instruction, based on the analysis, will be used with groups of academically at-risk adolescents. Following the instruction, knowledge transfer will be assessed by measuring students performance on a task that uses the interpretive structure in the social domain.

There are two anticipated outcomes of the study. First, the work will potentially move us one step closer to describing the structural organization of knowledge and its developmental changes throughout the school years. Second, the work will lead toward developing complementary cognitive curricula that aim at facilitating a central conceptual understanding of intermediate generality with a wide, yet delimited, application to every-day cognition as well as to scholastic tasks.

High School and the Advanced Placement Program

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More than thirty-five years ago the College Board created the Advanced Placement (A.P.) Program based upon the premise that university level material can be taught successfully to high school students who have outstanding ability plus the motivation to learn. By challenging these students, the Advanced Placement Program accelerates learning and enhances studies at both the high school and university levels.

BEGINNING AN ADVANCED PLACEMENT PROGRAM IN THE HIGH SCHOOL

Students and teachers who are interested in implementing an Advanced Placement Program can become involved by contacting The College Board's Advanced Placement Office in Western Canada (Mr. George Ewonus, Canadian Advanced Placement Coordinator, 212 1755 Springfield Road, Kelowna B.C., V1Y 5V5). A participation form is then to be completed and the registered school will receive Advanced Placement mailings. There are no fees to be paid and no costs to participate in the Advanced Placement Program. A school A.P. Coordinator must also be appointed so that the individual can receive all mailings sent by the College Board.

ADVANCED PLACEMENT SUBJECT OFFERINGS

Course descriptions and examinations for twenty-nine courses in a total of sixteen areas have been constructed. The following courses are presently being offered: history of art, studio art--general portfolio, studio art--drawing portfolio, general biology, general chemistry, computer science A, computer science AB, macroecnomics, microeconomics, English language and composition, English literature and composition, French language level 3, French literature level 3, German language level 3, comparative government and politics,

United States government and politics, European history, United States History, Vergil, Catullus--Horace, calculus AB, calculus BC, music theory, physics B, physics C--mechanics, physics C--electricity and magnetism, introductory psychology, Spanish language level 3, Spanish literature level 3.

SELECTION OF ADVANCED PLACEMENT STUDENTS

Procedures for selecting students for the Advanced Placement Program vary from school to school. Some schools screen their candidates by having prospective students write standardized tests and written examinations. Other schools accept all students who wish to enter the program regardless of their ability levels. Students who progress well in the program are usually those who are motivated to learn. They are individuals who have the desire to work hard at college-level material and who have above average skills in a particular subject area.

THE STRUCTURE OF THE ADVANCED PLACEMENT PROGRAM

The College Board outlines material that is to be studied for each A.P. course; however, few guidelines are given as to how that material is to be taught. Many schools involved in the Advanced Placement Program will first complete the educational tasks associated with their provincial curricula and then will move on to the concepts associated with the A.P. program. The program may be offered at all three high school grade levels, or it may be taught at only one or two levels. These decisions are made by each participating school.

THE SELECTION OF ADVANCED PLACEMENT TEACHERS

Many high school teachers, drawn by the prospect of instructing highly motivated students, will be interested in teaching a course in the Advanced Placement Program. While

this prospect is a reality, there is another less-appealing factor — the heavy workload associated with the program. The College Board provides content guidelines for teachers; however, specific curriculum decisions are the responsibility of individual instructors. In order to make wise curriculum decisions it is necessary that teachers have an extensive background in their particular area of expertise. A teacher new to the field of education may feel intimidated by the tasks associated with teaching Advanced Placement courses. In order to prepare lessons geared to the college level, it is also necessary for teachers to devote large amounts of their own time. When this is combined with the extra hours required for marking the numerous assignments that must be required of the students, the work load may be judged too heavy for some teachers who already have a demanding teaching schedule. Prospective Advanced Placement teachers should thus be knowledgeable in their subject area, and must be prepared to devote a great deal of time to lesson preparation and evaluation of students' work.

Teachers can learn more about instructional methods and techniques by attending Advanced Placement conferences which are held in various centers across Canada. They can also register in workshops and summer school sessions that are sponsored by the College Board. These subject-specific sessions are frequently conducted by experienced A.P. teachers who have had success in teaching the program and who have served as examination readers.

THE ADMINISTRATION OF ADVANCED PLACEMENT EXAMINATIONS

Advanced Placement examinations are held annually, at the beginning of May. These three-hour examinations are administered in the students' own schools and take place according to a schedule set up by the College Board.

A fee of approximately seventy U.S. dollars is charged for each examination that is ordered; however, if examinations are not written, they can be returned unopened and a refund will be given. In June, high school and college instructors are brought together to evaluate the free-response parts of the Advanced Placement examinations. These readers are appointed by the Educational Testing Service and are trained by their subject's Chief Reader.

THE REPORTING OF EXAMINATION RESULTS

After the free-response and multiple-choice sections of the examinations have been weighted and combined, the grades are reported based upon a five-point scale, as follows: 5 - extremely well qualified, 4 - well qualified, 3 - qualified, 2 - possibly qualified, 1 - no recommendation.

Colleges and universities which award advanced standing based upon A.P. examinations give credit for grades of four or five, while some colleges honor the grade of three. In recent years, more than one third of the A.P candidates earned grades of four or higher, one third received a grade of three, one fifth received a grade of two, and nine percent received the grade of one.

Students are mailed their results in mid-July and they have the option of having the College Board report their results to a post-secondary institution of their choice.

SUMMATION

The Advanced Placement Program is operating successfully in thousands of schools throughout North America and the world. It is of particular value when high school students feel a need for a challenge, and when teachers feel a responsibility to develop their students' potential to the utmost.

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Helping the Scientifically Gifted

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The purpose of this presentation is to summarize effective strategies and programs for nurturing those gifted in science. The basic assumption is that "no single formula can be developed which can be followed by all schools and all science classes" (Passow, 1957, p.112). Rather a smorgasbord of educationally accelerative opportunities (Stanley, 1979) should be available to enhance a student's potential for future development in science. Some items such as field trips might be thought of as appetizers, which are intended to spark an interest in science. Rigorous content-oriented curriculum such as Advanced Placement Biology would be the main course for some students. Participation in special science summer camps might be thought of as desserts that reward dedication throughout the school year. The decision regarding which item(s) from a variety of possible educational opportunities are most appropriate for a given student is a complex one which must be based on the characteristics of the learner (aptitude/achievement patterns, interests, level of motivation, career goals, developmental level, and socio-cultural conditions), the nature of the discipline (content knowledge, methodological skills, and personal traits needed to be a skilled practitioner), and the nature of the instructional option (goals, instructional activities, and staff competence).

Lessons from the sociology of science, psychology of eminence, and research in science education provide insights into the experiences that promote effective science achievement.

From the sociology of science (Zuckerman, 1977), it is possible to trace the career pathway of Nobel Prize winners. Future Nobelists attend elite undergraduate institutions. Successful performance at these elite schools leads to attendance at elite graduate schools with Nobel Laureates as supervisors. More than the content knowledge the future nobelists learn at these elite schools, they are socialized to think and behave as a scientist. This experience leads to publication in prestigious journals and subsequent recognition and promotion at elite institutions.

From the psychology of eminence, it is possible to gain insights into the stages of scientific process. Mansfield and Busse (1981) extended Wallas' (1926) Stages of the Creative Process (Preparation, Incubation, Illumination, and Verification) include the notion of constraints or barriers to scientific discovery. According to their model, scientific breakthroughs occur by chaining empirical, theoretical, or methodological constraints.

Research in science education provides insights into factors affecting science curriculum. Achievement results from the Second International Study of Science Achievement indicated that students

from industrialized countries with lower population growth had the highest science achievement. Other correlates of science achievement included early concentration of science content, simultaneous teaching of science content (teaching biology, chemistry and physics as separate subjects at the same time, which is different from Alberta's Science 10 integrated curriculum), studying a few subjects at the high school level, and having a low percentage of the age group in school (Keeves, 1991; Postlewaite, 1991). Results of meta-analyses of practices in science education indicate that innovative science curriculum improves science achievement about 1/3 of a standard deviation (Weinstein, Boulanger, & Walberg, 1982; Shymansky, Kyle, & Alport, 1983). Instructional systems on the average only improve achievement 1/10 of a standard deviation. The effective instructional systems were mastery learning and the personalized system of instruction which improved achievement .64 and .60 standard deviations respectively (Willet, Yamishita, & Anderson, 1983).

There are a variety of models for encouraging scientific development. These include early entrance to college, part-time college courses, Advanced Placement, the use of Diagnostic Testing/ Prescription Instruction (DT/PI) to facilitate Fast-paced scientific courses, specialized schools, extension programs and contests/competitions. Each of these approaches has support in the research literature. They focus on content acquisition, socialization as scientists, and provide opportunities for higher level scientific training.

RECOMMENDATIONS FOR NURTURING TALENTS/GIFTS IN SCIENCE AND TECHNOLOGY

An analysis of exemplary programs in China, Russia, and the North America in conjunction with the insights from the sociology of science, psychology of eminence, and science education provides a knowledge base for making recommendations regarding the discovery and development of gifts/talents in science. These recommendations relate to the topics of identification, science curriculum, and teacher/mentors.

Identification

The use of talent searches, olympiads, entrance examinations, and science fairs provides the opportunity for scientifically gifted students to demonstrate their ability in science and technology. These identification practices permit the opportunity for self-selection since students' participation is voluntary. Formal examinations should focus specifically on scientific content. Since mathematical reasoning ability facilitates the acquisition of scientific concepts, the identification of mathematically precocious youth through measures such as SAT-M is also beneficial.

Science Curriculum

Science curriculum should provide the opportunity for advanced study of scientific concepts and methodology. Students should know both the content of various scientific disciplines and the processes scientists use to discover knowledge. Students should be given the opportunity to conduct original research projects. In addition to conducting research, students need to

have the opportunity to communicate the results of their research by presenting at seminars and conferences and by writing articles for publication in journals.

During secondary schooling intensive coursework in mathematics and science taught at an accelerated pace should be coupled with adequate coursework in the humanities and social sciences. This training will provide a solid foundation for majoring in physics, chemistry, or biology as an undergraduate.

There is also a need for the science curriculum to address the ethical dilemmas that scientists face (Passow, 1957, 1988b; Pyryt, 1979; Tannenbaum, 1979). This need has been stated most eloquently by Tannenbaum (1979), who quotes Commoner's (1966) warning that " no scientific principle can tell us how to make the choice, which may sometimes be forced upon us by the insecticide problem between the shade of the elm tree and the song of the robin" (p. 104). The well-known instances of computer virus epidemics provide another example of the need for gifted individuals to use technology as a productive rather than destructive force.

Teachers/Mentors

All of the successful programs for nurturing gifts/talents in science and technology acknowledge the importance of the teacher. Passow (1957) identified the following characteristics as exemplifying a quality science teacher: is inspired and inspiring; knows science and its techniques; understands the meanings of science and its relationship to the world, encourages individual excellence; guides the student to locate resources; adapts teaching methods to stimulate problem solving; attempts to provide flexible programming to meet the unique needs of rapid learners.

Mentorship experiences provide students the opportunity to learn the nature of the discipline by personal contact with a practicing professionals. Through such experiences, individuals are socialized into the processes scientists use as well as their work habits, attitudes, and values. Exposure to appropriate role models seems especially beneficial for scientifically gifted females (Tobin & Fox, 1980).

Providing scientifically talented individuals with challenging curricula, and effective teacher/mentors is the key to nurturing their gifts/talents.

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Encouragement as a Motivator

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Encouragement provides an essential basis for motivation for all children. It is particularly important for gifted children. Often these children experience intense frustration, discouragement, or a fear of "failure" which may ultimately lead to an unwillingness to try. Encouragement is a key factor which helps the gifted child to have the courage to try in spite of the high levels of external as well as internal pressures which they experience. It is important that parents and teachers of gifted children learn how to be an encouraging person who can spark a child's willingness to try.

To encourage is to "put courage into" - the courage to try, to take a chance, to risk not being perfect. Such a willingness to risk being imperfect or wrong or even different can be overwhelming for many gifted children. Often gifted children are perfectionistic; they may succeed at everything they do but only engage in those activities at which they are confident they will succeed. Such children will not feel confident, will not have good self esteem, and will likely be afraid to try in areas of perceived risk. A child who has even one person in his or her life who is encouraging can provide that spark to develop the courage to try, to risk "failure".

Encouragement is a process of focusing on assets and strengths. This sounds simple, but is more complex than may be thought. To be an encouraging person, one must be perceived by the

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child as being encouraging. This perception is based not only on saying the right words, but as importantly, on our whole attitude and beliefs about people in general, and our interactions with them.

Encouragement is based on an attitude of acceptance, faith and confidence. This means and attitude of acceptance that the child is fine "as is", that the child does not need fixing or improving, but that the child does need support in the natural growth process. It is the faith that the child has the ability to cope with whatever they encounter in life. The intent is not to save the child from experiencing perhaps unpleasant parts of life but rather to support her/him in drawing on their inner resources and having confidence that she/he has the ability to cope.

The goal of encouragement is not to seek "perfection"; that is an unrealistic and discouraging goal. The goals of encouragement are to support the child in the development of courage, self-acceptance, self-esteem, confidence, internal motivation, a desire to contribute, and a desire to co-operate.

The traditional, the methods used to try to promote these qualities have been criticism, competition, and praise. Somehow, it was believed that children would be motivated to change and improve if they were just told what was wrong, were shown others who did better than them, or were told what they were doing that pleased others. What many people don't realize is that these methods are, in fact, discouraging. They steal the child's courage

to try; they reinforce that the child isn't "good enough"; they say that the child's goal should be to become the way others want her/him to be, rather than encouraging the child to be aware of and value her/his own sense of self.

Gifted children are born with a strong inner locus of control. They are motivated to learn, to grow, to be curious, to wonder, to try from inside. When we use praise with a gifted child, the message received is not to listen to this inner motivation, but instead to listen to what others want and expect. The children may develop confusion, anxiety, anger, and perhaps resentment at being told to ignore their inner messages and be what someone else tells them to be. Children lose touch with their inner motivation in an attempt to please others. It is important to recognize praise as an external motivator, because the motive often is to control the child through praise. The use of encouragement, as opposed to praise, allows children to get back in touch with their inner motivators.

To be encouraging means to focus on the child's: actions, feelings, thoughts, past identities (how the child saw her/himself), claim to fame (what the child did well or excelled at), or present strengths. To be encouraging we must model being encouraged ourselves so children see what it means to be encouraged. We must be willing to take risks, to try what we have never done before, and we must have the courage to be imperfect, to make mistakes and see them as opportunities to learn.

At the core of encouragement is the ability to listen, to allow the child to talk and be heard and hear her/himself. We must hear both the words and the feelings which are behind those words. We need to accept that this is how the child feels right now and not make judgments on those feelings and ideas. Incorporated in the action of listening is the process whereby the child begins to self-evaluate. Rather than us telling children what we think, we instead ask them what they are feeling and liking, and what they expect will happen.

To be encouraging we recognize any effort, any improvement, what has been done, not what hasn't. It is essential to focus on the deed not the doer. Encouragement is different than praise in that it can be done throughout an activity, it does not wait until the end to make an overall judgment on whether the result is good enough. With many gifted children it becomes expected that they will do what they do, well and easily. What they do is often not easy but it is easy for us to forget to recognize and acknowledge the effort that goes into those actions.

By valuing children's opinions, cooperation and contributions, and letting them know that we recognize and appreciate their effort, we put them back in touch with those inner motivators to want to try. Giving choices allows the child to have a sense of influence and control over what is happening to her/him. Also, giving responsibilities within the family for a share of the family chores allows the child to see her/himself as a valued

contributor to the family and reinforces their feeling of being valued for themselves. We need to avoid jumping in to solve our children's problems or removing the consequences to their actions. When we do these things, we send the message that we don't think that they can handle the problems themselves. Children feel encouraged when we believe in their ability to cope with their own problems.

As parents and teachers, we can help children to access their inner motivation to try and to achieve by accepting children as they are, not how we think they should be. We can encourage ourselves by accepting ourselves as we are now, not criticizing ourselves for not being the perfect parent or the perfect teacher. In order to be an encouraging person, it sure helps to feel encouraged ourselves.

A Paradigm Shift from Giftedness-As-Potential to Giftedness-As-Possibility

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The theme of the fourth annual SAGE conference is nurturing potential. Underlying this theme is the familiar assumption that giftedness is inner potential which must be nurtured if it is to manifest itself as extraordinary talent. Although such familiarity might at first suggest there is no need for further discussion, it is *because* giftedness-as-potential is so familiar that we need to talk further. When something is familiar we pass over it unquestioned, and "nothing is so silent as that which is taken-for-granted or self-evident" (van Manen, 1990, p. 112). Becoming aware of the silence, however, provides the conditions to listen to what the familiar voice has to say and to listen for other voices that speak differently about giftedness in deeply meaningful ways. In this session I interpret the historic-cultural meaning of giftedness-as-potential and take a turn around the hermeneutic circle to giftedness-as-possibility.

The educational gold mine

The gold mine is a long-standing metaphor for education that assumes giftedness-as-potential. According to this metaphor, good education results in the mining of the precious golden essence that is buried deep within individual students. The historical roots of this metaphor grow in the cultural soil of ancient Greece. In *The Republic*, Plato (1952) wrote that humans are created in three types, the best made of gold, the second best made of silver, with the common crowd made of brass and iron. Education proceeds by testing the metal of children. The assay mark determines the education they receive, or do not receive, and the positions they later fill within society. The golden few are provided the best education and groomed for guardianship of the community; the silver children receive a lesser education suitable for soldiers; the base-metal children are educated as laborers.

It is difficult to overestimate Plato's influence on the Western world. Whitehead (in Russell, 1961) asserts that "the safest general characterization of the European philosophical tradition is that it consists of a series of footnotes to Plato" (p. 122). Russell cautions, however, that it is the "fate of all great men" to be praised but not to be understood. Plato's plan provided a categorical model of Special Education that provides differentiated curriculum based on individual differences in potential. Plato assumed that because of qualitative differences in potential, only the golden few could be excellent. Plato used the concept of giftedness-as-potential to advocate elitism and justify inequality in education.

Our contemporary talk about giftedness-as-potential continues the Platonic tradition. Potential is spoken of as a "valuable natural resource." Children with sizable potential are referred to as "cultural capital." Productive students are grouped in a "talent pool". We expect our gifted children to save us from multiple ills. This is the language of exploitation and technologism rather than human education. The assumption of giftedness-as-potential

leads inexorably to defending an elitist system which accepts inequality on the premise that only *some* students have the "right stuff" to be gifted.

The gold mine metaphor turns attention to the essential *properties* of gifted potential. A psychological property is comparable to real estate, it is some "thing" you *own* or *do not own*. "Gifted property" resonates with notions of "landed gentry." Furthermore, it is the individual's duty to develop that property and not to develop one's potential is considered a waste of personal and societal resources. This means that children can be ranked and sorted in terms of productivity based on estimates of potential. This leads to subclasses of giftedness, such as achieving or underachieving giftedness. The resulting alienation and isolation of children that emerges from such efforts, can be traced to Plato's arguments that the human self is made up of inner properties which have the potential for growth and which define one's personal and societal worth. For the past 24 centuries, following in Plato's footsteps, Western culture has distinguished between *what* things are and *that* things exist: the difference between *essentia*, the ontical essence of things; and *existentia*, the ontological existence of things.

We take it for granted that when we want to know about giftedness we ask, "*What* is it?" *Essentia*, what is essential to a thing, leads to an emphasis on properties--what a thing has. To identify the essence of a "thing," is to abstract what is common to all those "things" in the form of a concept. Moreover, Plato insisted that the truth about some thing is captured in the concept or idea of the thing, rather than in the concrete case. According to Plato, if a thing can be defined in terms of its essential properties as a concept, that is all that needs to be known, or can be known, about that thing. Following Plato, a definition of giftedness is the taken-for-granted starting place for theory and practice in gifted education. Sillito and Wilde (1983) note that there are two major strategies: definition to process, and definition through process. Although the two strategies differ in their approaches, they are similar by assuming that giftedness can be defined as an abstract concept and its essential properties known. In other words, it is assumed that there is some "thing" or entity called gifted potential. What happens if giftedness-as-potential is one way but not the only way of understanding giftedness? How can we speak about giftedness in ways that do not assume giftedness is potential defined as essential properties?

Educational alchemy

Existentia is the coming into being of something and the wonder of not-yet, the future possibilities that life presents. Hermeneutics (Gadamer, 1989) is a pedagogically "other" voice in education that asks the ontological questions: *Is* giftedness? Under what conditions might giftedness be, or not be, a possibility for all children? The answer to these questions is not a definition, a concept with essential properties. The ontological difference draws us back into the wholeness of lived experience. The gift of life is a gift given to all persons. A gift is a possibility for those who see its possibilities. What this means is that giftedness is part of living in the world and making the most of life's possibilities. Living is the dynamic creative process of becoming more who we are. There is no stable potential to

measure because it is constantly changing. Giftedness-as-possibility turns attention to the coming into existence of giftedness. Moreover, all those who open themselves to the possibilities of living in the world are already and always on the way to becoming the best they can be as gifted physicists, gifted parents, gifted plumbers, gifted philsophers and so on. Here is educational alchemy.

The hermeneutic circle

The hermeneutic circle is a metaphor for the adventure of gifted living. The circle, perhaps the most ancient human symbol, discloses attempts to speak about the most vital quality of life, the dynamic creative striving of being and becoming whole. The meaning of "circle" goes far beyond the familiar Platonic geometric form. Throughout its venerable history, circles suggest plastic life-forms of flowers, snakes, and dragons and are not perfect spheres (Figure 1). In addition, Jung (1967) pointed out that most mandalas, the Tibetan name for sacred circles, are not round but "take the form of a flower, cross, or wheel and show a distinct tendency towards a quaternary structure" (p. 22). Figure 2 is a rectangular mandala with a cross with a recurring number four. Figure 3 represents the union of opposites in the squaring of the circle in alchemy.

Figure 1

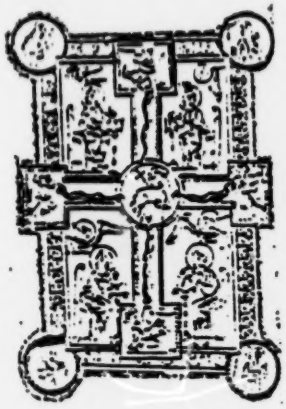

Figure 2

Figure 3

Figure 4 (Sparks, 1993), whose shape was suggested by Escher's (1967) woodcuts, is offered here as an aid to understanding the circular pathway of giftedness-as-possibility. The figure resonates with past historic-cultural attempts to speak about the wholeness of human existence, while guiding us along the complicated twists and turns of a contemporary inquiry into giftedness-as-possibility. The figure appears to have four surfaces and horizons. But if we imagine the figure to be a pathway that can be entered at any point and the surface followed around the figure, it becomes apparent that the figure is not four separate surfaces but one continuous path which leads the traveller around the figure four times. Four horizons of giftedness-as-possibility are discussed next.

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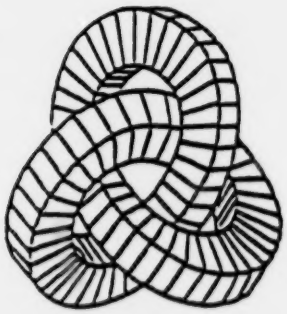

Figure 4

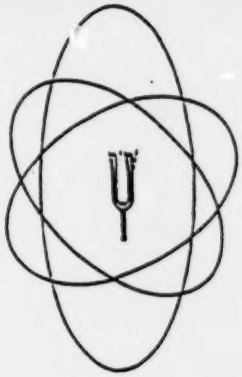

Figure 5

Imagination. Gifted living requires everyone to become "more" than they presently are by constantly striving to live beyond themselves. Imagination is the gift of forecasting the future and becoming at home in what is not-yet. Imagination does not happen in a void but requires students to understand the way in which what they already know, believe, and feel projects the horizon which enables and limits what they are capable of in the future. Possibilities for giftedness are lost when students reject the gift of predicting the future based on the past, and testing in some concrete meaningful way how their forecasts work themselves out in reality. Because imagining involves intentionality, being in the world and reaching beyond oneself, the gift is also lost if imagination is viewed as a solitary introspective activity.

Confusion. When we live at the growing edge, the boundary of the familiar and the strange, there is always the possibility of encountering something new and confusing on the horizon. Confusion is the gift of the "other" voice that speaks differently about a familiar topic. Possibilities for giftedness are lost when students ignore, reject, or abandon what appears confusing in their educational encounters. Some students mistake being confused with being a poor student. Others regard confusions as a technical problem to be corrected, rather than an invitation to explore the ever-new in life.

Question. There are possibilities for giftedness when students know that-they-do-not-know and generate questions to open a conversation to explore their gift of ignorance. Conversation is an art and it is somewhat paradoxical that one must already know something about the answer before one can ask a question that keeps the dialogue going. The back and forth of question and answer is an activity that requires keen attentiveness to the concrete, individual case. Possibilities for giftedness are lost when students regard questioning as a general technique, a methodical exercise that ignores the particularities of the situation.

The Fusion of Horizons. Becoming more who one is, requires losing oneself. In understanding something, we can only begin with ourselves. But in coming to understand something differently, we change. That transformation is a coming into ourselves. The term "fusion" signifies the sympathetic vibrations of student's being in tune with the text and

the topic (Figure 5. In losing oneself in a book, falling in love with science, or being transfixed by math, a student incarnates, makes one's own, the gift of the knowledge, feelings, and inclinations of others. Thus, a fusion of horizons transforms a student--here is educational alchemy. Losing the possibilities for giftedness happens when the curriculum does not come alive for the students and is stored as inert knowledge.

From giftedness-as-potential to giftedness-as-possibility

The gold mine metaphor with its focus on giftedness-as-potential misses the point of genuine gifted education. What the gold mine metaphor misses is the alchemical coming into existence of the gold in the first place. It is therefore with *becoming* gifted rather than with *being* gifted that education must be concerned. Education is fundamentally involved with the person in the making, not with one already made. The current obsession and perseveration with human potential as abstract, stable, inner properties, diverts attention away from the dynamic potentiality-for-becoming-more-who-one-is. Potentialities are dynamic and situated. The actualization of potentialities requires a reaching beyond the individual into the world, rather than a turning inward to mine potential. From a hermeneutic stance, all of us are already and always on the way to becoming gifted. Understanding giftedness as a permanent positive human possibility for *all* students provides the warrant and direction for inclusive education with excellence and equality for all.

Giftedness-as-possibility is a gifted way of living in the world--a way of dwelling in the possibilities which life presents. Giftedness-as-possibility is the adventure, the *advent* or coming of the future, toward which we are constantly on the way. We are all living that adventure. Giftedness-as-possibility reveals positive possibilities for excellence in all students within ordinary student practice. In the mundane everyday events of being a student, something transformational happens. A student understands herself differently, understands the text differently, understanding the topic differently. This is the alchemy of giftedness-as-possibility.

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STRETCH: Nurturing the Potential of the Gifted in the Regular Classroom

Sheila Spence & Jean Mudd
Red Deer Public School District #104

Over the years Red Deer Public School District has provided strong support for the education of their gifted and talented students. Presently each school in the district has at least one teacher who provides program leadership and instruction for gifted students. Like many school districts, we are now moving toward inclusive education for all students.

In order to provide a smooth transition and the necessary support for classroom teachers, we have developed *Stre-e-etch*, a teacher resource manual. This manual was developed by a committee consisting of teachers in the gifted program and one classroom teacher at each elementary grade.

The manual is designed to help classroom teachers enrich the core curriculum and extend those students with exceptional talents and gifts. The enrichment activities focus on specific curriculum topics arising in Language Learning, Mathematics, Social Studies, and Science. The activities emphasize development of higher level critical and creative thinking, and incorporate interdisciplinary connections among and beyond the four core subjects.

The Teacher Resource Manual contains

- suggestions for identifying gifted students
- outlines of strategies and processes that are suited to gifted education
  e.g. CoRT Thinking Skills, Creative Problem Solving
- curriculum based activities to be used with students in Grades 1 to 5
- a model for developing additional enrichment activities.

The following pages from the *Stre-e-etch* manual are examples of activities at two grade levels and a research strategy which encourages critical thinking.

Subject SOCIAL STUDIES Topic Alberta: Its People in History

THEME: CHANGE

What the curriculum says: *"A changing world often results in a changing lifestyle."*

Alberta Program of Studies

GATE O WAYS

GRADE 4

LEADING IDEA *Technological changes in communication affect the ways we live and think. Creative people take risks to present new ideas.*

ACTIVITY IDEAS

List or web means of communication - past and present.

CRITICAL THINKING

- *categorize*
- *sequence*

CREATIVE THINKING

- *fluency*
- *flexibility*
- *create an original method of communication*

RESEARCH SKILLS

- *location*
- *selection*

PRODUCT IDEAS

- *timeline on a specific means of communication or communication in general*
- *make a model eg. telegraph*

ACTIVITY IDEAS

Research a gifted inventor in communication: eg. Edison, Bell, Wright to find evidence for the leading idea.

CRITICAL THINKING

- *inference*
- *evaluation of strengths and weaknesses of the inventor*

CREATIVE THINKING

RESEARCH SKILLS

- *sticiman notes*
- *note taking*

PRODUCT IDEAS

- *"live" interview - TV or Radio*
- *present the life as a person talking about himself*
- *write a biography or diary*
- *dramatize events of an inventor's life*

ACTIVITY IDEAS

Examine how T.V. has affected our way of life.

CRITICAL THINKING

- *do PMI - Pros & Cons of T.V.*
- *design an experiment i.e. There would be no T.V. for a month. How would your life change?*

CREATIVE THINKING

- *brainstorm all the ways we use T.V.*
- *brainstorm for alternate activities a child could do instead of watching television.*

RESEARCH SKILLS

- *interview techniques (video, audio, note taking)*

PRODUCT IDEAS

- *video, documentary*
- *newspaper article*
- *design a new game*
- *radio play*

Interdisciplinary Connectors . . . . . .

subject Math

- *timelines*
- *prerequisite knowledge*
  - *measurement*
  - *scale*
  - *years AD and BC - related to positive and negative integers*

subject Language Learning

- *interview techniques*
- *Script Writing for radio or television*
- *operation of audio visual equipment*

subject Phys. Ed.

- *create a new outdoor game*

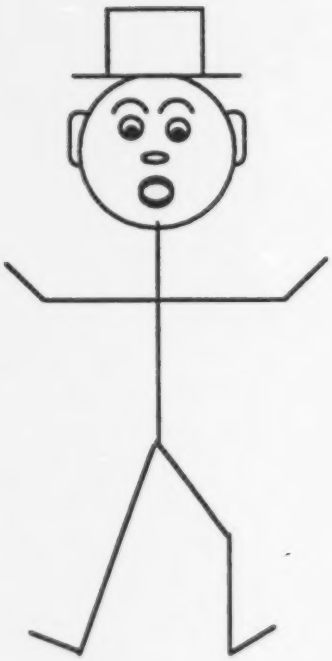
STUDENT RESOURCES

- *Social Studies Teacher Resource Manual, published by Alberta Education*
- *Native Education Project Resources e.g. "Land of the Blood", "The Pelgan"*

STICKMAN NOTES

What is it?

A visual cue for taking biographical notes that helps develop skills in interpreting information.



Strategies

Paraphrasing -

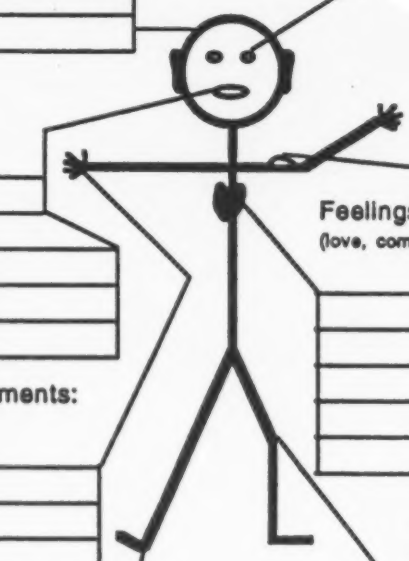
Making Inferences -

Drawing Conclusions -

Instructional Procedure

Using the stickman outline, students can begin to gather information from anecdotal records, biographies and letters.

The stickman form requires the students to make judgements as they gather notes.



Thoughts & Ideas:
(goals set, decisions made)

Influences Seen & Heard:
(who, what & how, early life, people, events eg. war, hunger)

What S/He Said:
(important quotes)

Strengths:
(skills, personality, training)

Feelings:
(love, compassion, anger)

Actions & Accomplishments:
(what was achieved)

Weaknesses:
(physical, personality, financial, educational)

Where S/He Went:
(birth, travelled, lived, death)

Date	What	Where

Bibliography:

Type	Author	Title	Copyright

PANEL

Implications of Inclusive Education for Gifted and Talented Children

Moderator
Carolyn Yewchuk

Panel Members
Lorraine Wilgosh
Donna Rankin
Tracey Schaufele
Susan MacDonald
Debra Chinchilla

The Case for Ability Grouping of Gifted Students

Carolyn Yewchuk
University of Alberta

The move towards inclusive education is flowing through the educational establishment like a huge tidal wave, sweeping all before it. It appears to be interpreted as an "all-or-none" practice: all children back in the regular classroom (Stainback & Stainback, 1992). This wave is in danger of capsizing the lifeboats which have kept gifted children afloat in the schools - differentiated instruction in groups of like-minded peers.

There is incontrovertible evidence accruing that gifted children achieve best when grouped with their intellectual peers for instructional purposes. For a long time, we have known from anecdotal and first-person accounts about the damaging and frustrating effects that regular classrooms can have on gifted students. Now we also have evidence from research which shows very clearly that the academic performance of gifted children improves with differentiated instruction in grouped programs.

In this brief article, I will summarize the results of exemplary research on the effects of grouping on academic performance conducted by James and Chen-lin Kulik. They have been analyzing the educational effects of grouping for the past decade. Their article in the Spring 1992 issue of *Gifted Child Quarterly* is a very clear and concise description of findings relative to gifted students. Unless indicated otherwise the data reported here are derived from this source.

To begin with, what is meant by "ability grouping"? Put simply, ability grouping is the provision of separate instruction for students of similar ability or achievement level. It is sometimes called homogeneous grouping, but is not equivalent in meaning to "tracking". In the American literature tracking refers to the assignment of students to programs on the basis of ability and/or

achievement, from which they do not move during one school year or from one year to another. Ability grouping, on the other hand, does not imply permanence of assignment; it refers to placement of students with others whose learning needs are similar to theirs, for whatever time arrangement is most appropriate (Fiedler, Lange & Winebrenner, 1993).

There are many different ways of grouping students by ability for instructional purposes. As we shall see from the research evidence described below, the way students are grouped and the type of curriculum that is followed have differential effects on academic performance. The effects are not the same across different kinds of ability grouping.

When Kulik and Kulik began investigating the effects of grouping on performance they had available to them a new statistical technique called meta-analysis (Glass, McGaw & Smith, 1981). This is a method of summarizing the results of many different studies conducted by different researchers. Typically the meta-analytic researcher locates all of the studies which have been done in the past on a particular topic; in the case of ability grouping, the research base includes more than 700 studies (Kulik & Kulik, 1982). Only those studies which report using a control group of students in addition to an experimental group are suitable for meta-analysis. The summarized difference between experimental and control groups is reported as "effect size". An effect size of 0.20 is considered small, 0.50 is in the medium range, and 0.80 is considered large. Effect size can be interpreted on a grade equivalent scale, with 0.10 equatable to one month of achievement on standardized achievement tests. A positive effect size indicates that the performance of the grouped students exceeds that of controls; the opposite is true for a negative effect size.

Kulik and Kulik (1992) looked at the effects of grouping in five different administrative arrangements. Separate analyses were conducted within each of

these groupings. It is important to separate out type of grouping, because the experimental effects for some arrangements are lost through averaging with all forms of grouping, leading to the erroneous conclusion that grouping has no demonstrable effect on academic achievement.

1. Multilevel classes.

Sometimes referred to as XYZ classes, multilevel placement is intended to facilitate instruction by grouping students of similar ability. Students in the same grade may be divided into groups such as high, middle, and low, and placed together in separate classrooms (usually elementary) or for single subjects (usually secondary). A standard curriculum is followed, irrespective of group, with no adjustment of curriculum and methods to ability level. The Kuliks located 56 studies which examined the effects of multilevel placement. The results indicated a negligible overall effect size of 0.03. However, when effect size was computed separately by level, the effects were variable: 0.10 for high ability; -0.02 for middle ability and -0.01 for low ability. Thus the high ability students, even in the absence of a differentiated curriculum, performed better than control students, medium-ability students and low ability students. It should be noted in passing that separation by ability had negligible effects on the achievement of medium and low ability students compared to students in mixed-ability classes.

2. Cross-grade grouping.

Cross-grade grouping is usually subject specific, and is most often used for teaching reading in the elementary grades. Students from different grades are assigned to groups based on instructional level. In the best known plan for cross-grade grouping, the Joplin Plan, for example, students from grades four, five, and six are assigned to a reading group based on reading skill, not grade level.

Each reading teacher works with a class that varies in age but is relatively homogeneous with respect to reading ability.

Cross-grade grouping is similar to multilevel grouping since students of similar ability are grouped together. However, the number of levels of instruction is usually greater and there is more curricular adaptation in cross-grade plans. In contrast to multilevel programs, different materials and methods are used with students of different ability levels in cross-grade grouping.

Meta-analysis of the 14 studies of cross-grade grouping revealed a small and significant overall effect size (0.30). Comparisons of achievement by ability level produced a small effect for high-ability students (0.12), a negligible effect for middle-ability students (-0.01) and a larger effect for low-ability students (0.29). Thus the most beneficial effect of cross-grade grouping is with low-ability students.

3. Within-class grouping.

Teachers often group or "cluster" children within their class according to ability for instruction in subjects such as reading and arithmetic. The purpose of the clusters is to provide differential instruction to different groups of learners. Thus within-class programs provide for differentiated curricula like the cross-grade plans, but the children do not leave their regular classroom.

A small but significant effect size (0.25) was found on average in the eleven studies of within-grade grouping. There was a positive effect for all levels: 0.18 (medium-ability groups), 0.16 (low-ability groups), and greatest of all, (0.30) for high-ability groups.

4. Enriched classes for the gifted and talented.

In enriched classes, students of high ability are provided a more challenging program with differentiated curricula, materials and methods that are different from those used in the regular classroom. This type of grouping is designed

specifically for gifted children and is usually taught by a specially trained teacher. Kulik and Kulik identified 25 studies dealing with special programs for gifted and talented students with a moderate overall effect size of 0.41.

5. Accelerated classes for the gifted and talented.

Acceleration involves movement through the curriculum at a faster rate than same-age or same-grade peers. The 23 studies on which Kulik and Kulik based their meta-analysis included the following types of rapid advancement: compressing curriculum (e.g. four years in three), and extending instruction beyond the school year (e.g. four years in three with five summer sessions).

The 23 studies used two different research designs. Half the studies used same-age controls, that is, those students who were equivalent initially to the experimental group in age and aptitude, but were behind in grade level at the end of the study because they weren't accelerated. The effect size for same-age controls was 0.87, or almost an entire year in grade equivalent terms.

On the other hand, in the studies which compared accelerated students with same-grade controls, that is, older, non-accelerated students with the same aptitude, the effect size was -0.02.

Summary

A summary of the achievement of gifted and talented children in different types of ability groupings appear in Table 1. Effect size indicates achievement which is beyond normal expectation for one school year, as measured on grade-equivalent scores on standardized achievement tests.

It is obvious from Table 1 that degree of academic gain is a function of program type. The greatest gains are found in those programs that not only group high ability children together but also provide a differentiated curriculum matched to their abilities and skills. When the students are placed together but taught the regular curriculum (multilevel grouping), the gains are small. When

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the curriculum is adapted to their interests and capabilities (enrichment) and/or to their rate of learning (acceleration), the gains are most pronounced.

The beneficial effect of homogeneous grouping with differentiated instruction is also evident for students of medium ability (see Table 2) and low ability (see Table 3). The achievement of medium and low ability students does not drop when grouped together with similar peers. In fact, in those types of groupings where skill level of students is taken into account, performance rises, particularly for low ability students.

Thus the research evidence shows that all students benefit from being grouped for instruction by ability. Gifted learners, especially, flourish academically in classes with their like-minded peers. It is premature to disband instruction within ability groups for gifted and talented children. We must maintain the life boats and resist the tide of inclusion which would sweep them away.

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Table 1

Achievement of Gifted Students

Grouping type	Effect size
Multilevel	0.10
Cross-grade	0.12
Within-class	0.30
Enrichment	0.41
Acceleration	0.87

Source: Kulik & Kulik (1992)

Table 2

Achievement of Medium Ability Students

Grouping type	Effect size
Multilevel	-0.02
Cross-grade	-0.01
Within-class	0.18

Source: Kulik & Kulik (1992)

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Table 3

Achievement of Low Ability Students

Grouping type	Effect size
Multilevel	-0.01
Cross-grade	0.29
Within-class	0.16

Source: Kulik & Kulik (1992)

Implications of Alberta Education Policies and Practices for Gifted Students[1]

Lorraine Wilgosh
University of Alberta

Alberta Education has attempted to develop policies and practices which will meet the educational needs of all Alberta students. The Minister of Education in 1991 said:

> Our focus will be on doing what's best for disabled students -- developing their full potential. Integration into the regular classroom will be the norm for disabled students and will give them the chance they need to learn, to grow, and to become full participants in our schools and in our society. (Alberta Education, 1991a, p. 2)

Alberta Education (1991a) proposed that the best interests of the child would be the basic consideration. Integration would be the option of first choice "for the vast majority of Alberta school children" (p. 2). Only when the child's needs could not be met in the regular classroom would removal be considered, with return to the regular classroom the primary focus of programming.

Another Alberta Education (1991b) document was released following the above Alberta Education position paper on integration. Vision for the nineties...a plan

of action affirmed that "integration into the regular classroom must be the norm for special needs students so that they get the programs and services to succeed to the best of their abilities" (p. 32).

Those other children with special needs, who are gifted and talented, were not recognized in the report as having "special needs." Rather, reference was made to their "diverse learning needs" (p. 19). Alberta Education's (1991b) separate policy for "gifted" students stated, "Our brightest and most capable students must be challenged to excel" (p. 19). For those young people, Alberta Education proposed establishing "specialized public and private schools in areas of study such as science and technology, fine arts, and business... challenge programs... Specialized schools enlarge the opportunities for students to develop their strengths and talents" (p. 19).

Subsequent documents produced by Alberta Education (1992, 1993) have reported a degree of success within the province's schools, in integrating children with disabilities when it is in the best interests of the

children to do so. However, over 75% of surveyed teachers and about 60% of surveyed administrators and trustees were of the view that teachers do not have the training and support to successfully integrate students with disabilities (Alberta Education, 1993).

Also, success has been reported in providing more opportunities for capable students, in the form of academic challenge and alternative arts programs, as well as leadership courses. There is an expressed commitment to establish public specialized schools to provide more opportunities for the most capable students. Survey results (Alberta Education, 1993) have indicated that about two thirds of educators believe Alberta's most capable students are "challenged", apparently supported by success of those students in provincial diploma examinations.

The policies of Alberta Education seem, at face value, to offer the promise of educating children with disabilities in regular classrooms and schools with non-disabled peers, while also promising to provide separate, specialized schools and programs so that the "brightest

and most capable students" can be challenged to excel. There is an potential conflict between these policies. Inclusive education would appear to be best for children with disabilities while some degree of segregation would appear to be best for those who are brightest and most capable. Can we teach tolerance and understanding for all people in exclusive, specialized schools and programs, a question asked by those advocating integration of children with disabilities? Where does the gifted child with disabilities, or the gifted underachieving child, belong? Where do we place the child with special talents, who would not necessarily fall into the category of "brightest and most capable" as measured by provincial diploma examinations or other standardized achievement measures? These policy conflicts, which lead to dilemmas in attempting to offer best practices, will need to be resolved.

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[1]This paper is a summary of a presentation by the author on Alberta policies and practices regarding inclusion at the Society for the Advancement of Gifted Education (SAGE) conference in Edmonton, in September 1993.

Implications of Inclusive Education for Gifted and Talented Children: A Parent's Perspective

Donna Rankin
Alberta Associations for Bright Children

In today's economic realities, many school budgets do not allow for special classes for gifted students. In small, rural school systems such as mine, inclusive education is the only option.

The special needs of an intellectually gifted child are as valid any other "special needs student". Gifted children can not always make it on their own. Encouragement and focus on the student's strengths are the best approaches

Home and school need to work as a team to make the child's school experience the best possible. Communication is the key.

I chose not to identify my school system because I believe our experiences are typical of many cases. I like many aspects of my school system and have enjoyed good communication with teachers.

The official District policy on Enrichment Programs is as follows: "Enrichment activities are available for students who require additional challenge. Enrichment includes supplementing and extending the Alberta curriculum."

In reality, programming for gifted students is the responsibility of individual classroom teachers, who plan open ended assignments. Each student may elaborate and embellish their work.

My experience with school systems has been as the parent of a gifted child who is also behaviorally challenged.

Focus so far has been on eliminating unacceptable behaviors rather than building on strengths. Once the child conforms to classroom behavior standards, then the school might talk about enrichment for the student. As a parent, I felt that the source of much poor behavior was boredom and frustration. At times, when I asked for academic goals, I felt I was treated as an adversary rather than part as of a team.

I appreciate the difficulty teachers have in coping with multi level classrooms. It is hard to be everything to everybody. Parents acknowledge the toughness of the job. Limited funding for special education is spent first on physical apparatus and personnel to help physically and intellectually challanged students. In our integrated schools, this is necessary. It is reality.

How can we help our underachieving gifted?

Recommendations:

(1) The Education Response Centre provides direction and leadership to school boards in providing special education programs. It is my understanding that the Provincial Co-ordinator of Guidance and Counseling can be requested by school boards to provide guidance and assistance in developing programs for bright children.

(2) School personnel, as well as parents should stress positive reinforcement and encouragement. (Parke, 1989, p. 13),(Rimm, 1986. p.285). (Wentzel. 1993. p. 363)

(3) Parent volunteers can be used as mentors. classroom helpers, or research supervisors. My school system already makes excellent use of helpers for primary grades. special outings, and some special needs students. Gifted and talented children would also benefit.

(4) More parent - school dialogue is needed about the nature of underachievement and joint strategies developed to attack the problem from both directions.

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Wentzel, Kathryn R., (1993), " Does Being Good Make the Grade ? Social Behavior and Academic Competence in Middle School", in Journal of Educational Psychology, Vol. 85, No. 2, p. 357-364.

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The following helpful books are aimed at parents.

Coloroso, Barbara, (1989). Winning at Parenting .. without beating your kids. Audio tape set with booklet

Kurcinka, Mary Sheedy, (1991) Raising Your Spirited Child, A guide for Parents Whose Child is More, Intense, Sensitive, Perceptive, Persistent, Energetic.., HarperCollins Publishers, New York.

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Samalin, Nancy, (1991), Love And Anger: The Parental Dilemma, Penguin Books

Inclusive Education: Teachers' Perspectives

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Vernon Barford Junior High School
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Mayfield Elementary School
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As teachers, we were asked to present our viewpoints re: inclusive education and the gifted child. Our teaching backgrounds are quite different, yet it is interesting that we share a common viewpoint about how inclusive education will impact our gifted students. One of us currently teaches elementary school—an inclusive classroom which contains cross grading, Down's Syndrome and Behavior Disordered children. The other of us teaches a self-contained Gifted Class of twenty-six Grade 7 students.

Our first concern is that the needs of the Gifted child both academic and affective, are met. We cannot only look at the marks and IQs of our gifted children. Their needs are much more complex than that. We, as teachers, need to know how to identify the gifted child, and need to be allowed to provide the extra time they require for academic guidance and even counselling.

The term 'inclusion' can be interpreted many ways. At its purest level, it means that all students, regardless of their ability or disability will be schooled in their neighborhood school, and, further, that they will be mixed in with all other children. It disallows 'special' classes, and is of the view that the regular classroom teacher is the best person to educate all. We realize that there are many variations of inclusion in practice, and they achieve varying degrees of success. However, for the purposes of speaking to the area of gifted and inclusion, it is best not to "muddy the waters" with grey areas.

One of our major concerns, as teachers, is that the needs of the gifted will not be met in an inclusive setting. Teachers do their best, but it will be the 'squeaky wheel gets the grease'. By that, we mean that the Behavior Disordered student, who hangs from the light fixtures will demand the teacher's attention, while the gifted student may quietly tune out, and become negative about school in general. We are concerned that these children may become gifted underachievers, who are at risk of dropping out of school, altogether.

Teachers sometimes become caught in the "Robin Hood Effect", in which the 'good' gifted student can be left to work on his/her own, while instruction time and individualiza-

tion is given to the lower end of the academic spectrum. This is, in effect, robbing from the rich to give to the poor.

This is not to say that the teachers are not doing their best. It is just human nature to attend to those who clamor for attention. Teachers cannot be expected to do it all. So, whose needs will not be met? We fear it will be those of the gifted.

We allow other professions to train specialists. Doctors are permitted, by society, to choose areas of strength for their focus. We, as members of society respect our heart specialists, our brain surgeons, our ophthalmologists. We would not dream of making them all become general practitioners. Yet, we have no qualms about dictating that all of our teachers give up their specialities, and teach all students. Is this best for our children? Is it best for our teachers? Is it best for society?

Decisions about inclusion must not be unilateral. They should be determined in the context of what is best for each particular child, each particular teacher, and the dynamics of each particular school. Parents, teachers and administrators must not put the needs of the gifted children second to those with more obvious and demanding exceptionalities.

Inclusive Education—Good For All???

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The opinion I am expressing today on the implications of inclusive education practises for our gifted/bright students has come from my child's school experience and that of related experiences of other such children enroled in the Edmonton Public School System and elsewhere in the province of Alberta.

What is the school experience for children in an inclusive education classroom? And how would inclusive education impact my child? In inclusive education a central concept is child-directed learning, as well as cooperation amongst students in learning, sharing and helping each other. All this is done in mixed ability groups. There would not be segregated settings nor grouping of intellectual peers (no district academic challenge program). To answer the previous questions one must ask other questions. Can a bright/gifted child's educational needs be easily accommodated in mixed ability groups? Can a bright child stay motivated (child-directed learning) when all the other students in the classroom are doing work he already knows or if he is doing work that no other students are doing- in other words he always works alone? Can a bright child cooperate and share in a meaningful, satisfactory way in a group where he knows the most and is academically more able than the others to put the project/report together? Can a bright child be helped by other

students in a group where the other students are not as academically advanced? Do most teachers know what an individual education plan is and do they know how to prepare one? Can the bright child's rapid rate of learning be easily accommodated without either disruption to the class or by placing unreasonable expectations on the teacher?

My observations of my son's past seven years of education lead me to believe the answer to all the above questions, for most bright/gifted students is no. It is especially hard for a young child to stay motivated when all his friends/classmates have absolutely no interest in what he's doing or if they are interested they remain observers because they are unable to contribute anything new and perhaps cannot even participate because of a lack of ability. It's academic loneliness and isolation that bright children face in mixed ability classrooms. Working in groups to complete projects often results in resentment being felt by all. The bright child often does most of the work and the other children do little. The bright child gets tired of doing all the work and the other students get tired of the bright one always being the leader/director, the know-it-all. Sometimes the bright child will hide his academic abilities in order to temper these resentments or in order not to be called the geek/nerd. No one benefits from this situation. Sometimes the child will look with disdain upon the other students - they can't see what he sees or they can't grasp the ideas as quickly. He may come to view himself as superior in every respect. Sometimes the

bright child may be asked to help teach others in his class. This puts yet another barrier between students and adds to the loneliness and isolation of the bright student in the mixed ability classroom. Also, teachers have yet to become expert in the preparation of individual education plans and have yet to be given enough classroom support to be able to have meaningful academic interaction on an individual basis with their students. If gifted/bright students are grouped with others of similar abilities and receive differentiated curriculum they could remain motivated and really cooperate in a meaningful way. This grouping would enable them to move ahead at a faster pace without disrupting the classroom or placing an onerous burden on the teacher*. So, it seems to me that the movement away from ability grouping for gifted/bright children would seriously decrease the quality of education for many gifted/bright students. This is especially so when funding cutbacks will force teachers to face the impossible task of providing all things to all students. Obvious in this is that the teacher will put more energy into helping students who are struggling , leaving little energy for the bright/gifted child. So, having said that inclusive education practises are not the best for many bright/gifted children, what educational practises are needed in schools in order that the gifted/bright child's needs are met?

Alberta Education has said "The best interests of the child should be the basic consideration for all placement and programming decisions*." As well, in 1990 The Canadian Parliament adopted article 29 of the U.S. Convention on the Rights of the

child - that the education of the child be directed to "the development of the child's personality, talents and mental and physical abilities to their fullest potential." In order to accomplish these ends Alberta Education has said we must have a range of education options and parental input into determining what those options should be*. Many parents, myself included, have seen or heard of the video Failing Grades* and have read in the magazine Western Living* of the confusion of British Columbia's Vision 2000 education policy. Many other articles and video's point out that models of education that emphasis adopting one major method of instruction such as inclusive education have some students that pass through the system without acquiring basic skills. Might not those students have been better served by a different model of education. And should it not be acceptable that a school district offer a variety of instruction models in order that parents might be able to better place their children in an educational setting that best suits that child? The responsibility of identifying the right style of learning for a gifted/bright child and the right milieu for that child must be shared by the parents, teacher, principal, and education phycologist. Most parents know their children far better than the ever changing scenario of teachers, and principals. Parents must take a greater chunk of responsibility for their child's education.

In conclusion I quote Thomas Jefferson who once said "There is nothing more unequal than equal treatment of unequal people." To ensure that all gifted students have an education that

develops their abilities to the best of their potential it is important to have a broad range of options in the school system. Options such as: mixed ability classrooms, pull-out enrichment programs,acceleration, full-time segregated academic programs (academic challenge), homeschooling, multi-age groupings, International Baccalaureate program and distance education services will serve to ensure that most gifted/bright students will not pass through the system without achieving close to their potential. I understand the transportation limitations for offering more options in rural settings but I understand also that the urban settings can more readily offer options.

Choice has worked well in the Edmonton Public School System. Currently in the system there exists a broad range of choice of education experiences for the gifted/bright child. Most parents applaud this decision to offer options. Parents from other districts look with envy at the range of options offered here. Gifted/bright children are well served in this system and I believe that this system should be the model for other districts interested in serving the needs of gifted/bright children.

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